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Learning and Instruction

FORTY-NINTH YEARBOOK, PART I

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FORTY-NINTH YEARBOOK

OF THE

NATIONAL SOCIETY FOR THE STUDY OF EDUCATION

PART I
LEARNING AND INSTRUCTION

Prepared by the Yearbook Committee

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EDITOR'S PREFACE

The Forty-first Yearbook of this Society, comprising the two volumes, *Philosophies of Education* and *The Psychology of Learning,* presented authoritative expositions of the most influential systems of thought regarding the ultimate aims of education, on the one hand, and the nature of human learning, on the other. The motive of the present yearbook, *Learning and Instruction,* is the marshalling of significant facts and accepted generalizations derived from research and experimental studies of learning problems and the ultilization of such new knowledge in the promotion of a desirable reorientation of instruction in the elementary and secondary schools. These three volumes will constitute a valuable sequence in the professional reading of teachers in schools and colleges.

Professor Anderson's original proposal for a yearbook dealing with the problem of the improvement of instructional procedures was reviewed by the Board of Directors at its meeting in October, 1946. The suggestions proposed by members of the Board were presented to Mr. Anderson by Mr. McConnell, who also represented the Board of Directors in further conferences for the consideration of suggestions offered by several other specialists in the field of educational psychology. The resulting revision of the proposal was approved by the Board in the autumn of 1947, and the selection of members of the yearbook committee was made at that time.

The effective design of the two volumes of the Forty-first Yearbook is attested by the continuing demand for both volumes for use in courses in teacher-training institutions and in connection with inservice programs in schools and school systems. The usefulness of the present yearbook is assured by the successful outcome of the committee's efforts to clarify any sources of confusion among teachers regarding the underlying causes and the educational significance of the current shift in the theory and practice of teaching from the traditional emphasis on techniques of presenting curriculum content to the guidance of learning experiences of school children toward the attainment of properly selected goals. A distinctive feature of the text is the recurring use of the device of applying pertinent principles of learning to the solution of particular types of instructional problems, some of which are commonly identified with the objectives of instruction characteristic of specified phases of the school program, others perhaps being associated with environmental factors affecting learning or with the nature of the activities of groups of learners at different stages of advancement in the school program. There is good reason to assume that the professionally minded reader will accept the declaration with which the final chapter of the yearbook closes, namely, that classrooms "should cease to be lesson-hearing rooms and become laboratories for learning."

NELSON B. HENRY

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INTRODUCTION

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Purpose of the Yearbook

The purpose of this yearbook is to focus the relevant data and concepts from the psychology of learning upon the problems of instruction in the elementary and secondary schools. The achievement of this purpose involves four steps: first, stating how learning proceeds as a general psychological process and how children are motivated to learn; second, describing how respective aspects or categories of behavior, such as motor skills or attitudes, are learned; third, pointing out the implications for instruction of accumulated knowledge from the field of learning; and fourth, redefining instruction in terms of the school as a laboratory for learning.

This yearbook will, it is hoped, symbolize the shift in thinking concerning educational method during the last thirty-five years which is reflected in a change of emphasis from "techniques of presenting content" to "directing the learning of the child."

The problem and contribution of the yearbook must be seen in the perspective of the entire problem of education. Perhaps the fundamental development in educational theory of the last fifty years has been the approach through a statement of principles of education. Students of education are attempting to set down the basic principles in the various fields—administration, curriculum, instruction, student personnel work, evaluation, and so on—from which sound practices can be derived and against which they can, in turn, be evaluated. These students of educational theory are evolving such principles in part from a systematic philosophy of education and in part from data that are being accumulated through research on both instructional procedures and the nature of children—how they grow, develop, and learn, and how they differ from one another. The philosophy is in large measure a social one, formulated in the frame of a democratic social order. It is, of course, true that these educational principles undergo almost constant modifications as philosophy is reformulated and as research grows.

The principles which are crucial for the instructional program are those which pertain to the nature of objectives, the organization of content and activities, the guidance of learning experiences, and the evaluation of the educational product. This yearbook is primarily concerned with the principles related to the guidance of the learning experiences as they can be derived from the study of how children learn. This is not to say that those who instruct are less interested in other principles related to instruction or that they are only secondarily interested in the contribution which a philosophy and sociology of education can make to instruction. It is simply to say that this yearbook must be delimited. It is being delimited to principles for guiding the learning of children in the elementary- and secondary-school environment.

THE PROBLEM OF INSTRUCTION

The problem of instruction is now conceived to be essentially one of how to guide, direct, and evaluate the learning of children and youth so that the attainment of socially approved behavior patterns is assured. It is the task of the school, first, to assay society's needs and *to define the kinds of behavior* which children and youth must exemplify for effective living in the American democracy. Second, the school must *select the curriculum content and the activities* which will, as they are experienced by pupils, assure the attainment of the requisite standards of behavior. Third, the school must *skilfully organize instructional and activity programs* and *cause children to so interact* with them that the new behavior patterns will emerge. Fourth, the school must *evaluate this behavior* with respect to the school's original objectives and repattern its procedures if the behavior is found wanting.

In only the most general aspects of the program are these processes of definition of objectives, selection and organization of content, and evaluation carried out by the school apart from the actual instructional processes. Teachers and pupils themselves should be active participants in all these processes. In the best sense, the term "school," as here used, includes teacher and pupil personnel as well as those members of the staff who hold administrative or supervisory positions.

The teacher in the school is in the business of assisting children to acquire behavior patterns which will assure optimum adaptation to the environments in which they live. While the teacher and total school environment must contribute to the development of a rich nurture for the maximum normal growth of the child, it is not enough in our society that children merely grow up normally without untoward incident. Life in our culture makes demands which are satisfied only as each individual learns specialized ways of behaving that are definitely outside the pattern of "normal" development or growth. These specialized behavior patterns become educational objectives, and the school is enjoined by society to see that children learn them. Left to himself, the child would not "normally" learn to read, compute, share, or brush his teeth. These things are learned as a result of the child's being placed in a specialized environment such as the school. The teacher, consequently, is busy making children over in the sense that he is guiding them to behave in ways that they would not otherwise behave. Since a change in behavior which results from experience is the generally agreed-upon definition of learning, the teacher is one who guides or directs the learning of another so that socially desirable kinds of behavior emerge.

Education's method should thus consist of those procedures by which learning is most wisely guided or directed. Too often those who have defined educational method have not been aware of their true task. Instead of focusing on the central problem—how to guide the learner wisely—they have focused on peripheral problems such as the techniques of presenting information and of teaching useful skills. It is, in part, a purpose of this yearbook to orient educational method to a more proper task—that of defining the most effective means for inducing types of behavior among pupils that harmonize with the purposes of education. Educational method must be written and practiced in terms of the child and how he learns. That is why we have said this yearbook should symbolize a newer concept of method as the process of directing children's learning rather than as the application of techniques designed merely to impart information.

Method—Historical Perspective

The problems of instruction are perennial. A considerable part of the history of education is a history of attempted solutions of the problems of instruction. In his book on the problems of education, Brubacher[1] found it desirable to devote eighty-four pages to a history of method, sixty-nine to the curriculum, and not more than forty-four him what the practical task of the teacher is. He often spurns the sources which tell him what the teacher's work is really about. He often has too little knowledge about research in curriculum and in instruction in the various fields. Consequently, his contribution to the teacher's training has been theoretical, and his specific contribution to teaching procedure has often been untested.

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[1] John S. Brubacher, *A History of the Problems of Education.* New York: McGraw-Hill Book Co., 1947.

Method—Teaching Subject Fields

Probably the most significant developments in method which have been made in this century have occurred in the theory and practice of teaching in selected subject fields. Frequently, the approach to instructional problems in school subjects has been made through the methods of psychology. The theory of the teaching of reading and of arithmetic has been revolutionized in American education since 1915. This has occurred in part because of the developments in the psychology of reading and the psychology of arithmetic. The names of contributors to the psychology in these fields of learning—Judd, Thorndike, Gates, Buswell, Brownell, and others—are the names of educational psychologists. Another important source of influence has been the work of educational researchers such as Charters, Brueckner, Horn, and Gray, whose work has often been concerned chiefly with the curriculum. Instruction in reading and arithmetic has, then, undergone fundamental change because of the development of the psychology of these two fields—a psychology largely written in the last thirty years—and because of the development of experimental education.

The field of spelling provides another example of the noteworthy contributions of experimental education. In this area, through word counts and other techniques, we have succeeded in arriving at content scientifically. Through educational research and analysis we have standardized teaching procedures sufficiently to say that it is possible to teach spelling with the assurance that should make teaching a true profession. This is not to say that spelling is always so taught. But in this and other fields, such as the teaching of English at the high-school level, a body of research has been produced which has had a considerable effect upon instruction.

Current Neglect of Instructional Problems

Notwithstanding these evidences of progress in selected areas, instruction, *as such*, has been a neglected aspect of American education in the last quarter of a century. Except as it has been studied and improved within certain of the teaching fields, little attention has been given to its general improvement. The time of the students of educational theory has been largely occupied with the curriculum.

It might be said that there have been few systematic treatments of general educational method since Morrison's *The Practice of Teaching in the Secondary School.* The work of Burton and Hopkins cannot be ignored, but the writings of these men stand almost alone since Morrison's contribution in the mid-1920's. It is possible that the seemingly current neglect might be a good thing. It might be a mark of stability in a field that saw one passing educational methodology, so-called, follow swiftly upon another in the first quarter of the century. Following the Herbartian emphasis at the turn of the century, we saw, in turn or concurrently, a wave of interest in the activity movement, the Dalton plan, the problem and project methods, the socialized recitation, supervised study, and the unit method. On the other hand, the second quarter of this century has been marked by fundamental educational contributions that are essentially concerned with the curriculum. The numerous discussions of general education, the publications of the American Youth Commission, the evaluations of the Progressive Education Association's eight-year study, the extensive reports of the Commission on the Social Studies, the reports of the Educational Policies Commission, and other reports of the character of these, are, as Newton Edwards has suggested, a part of the quest for a content of education. They are directed toward curriculum improvement, but they have implications of great significance for instructional procedures.

A New Formula for Instruction Now Possible

We are now, however, on the verge of a change in educational thought and practice as it relates to the teaching act, a change that gives promise of establishing an essentially new formula for teaching. As Burton has pointed out,[6] most of the improved practices in the development of educational method have been an improvement upon what he has called the assign-study-recite formula. The developments of the second quarter of this century, some of which are not yet generally sensed, have broken from this pattern. *A basically different procedure in the area of instruction is at hand.* The rise of the new concept has been an evolutionary one, but the present theoretical status of teaching can be defined as in fundamental opposition to the assign-study-recite procedures.[7]

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[6] *Ibid.*, p. 221.

Assign-study-recite procedures involve the assumption that learning is synonymous with memorizing (study) and that instruction is a matter, first, of defining the content to be learned (assignment), and, second, of checking-up to see that the "lesson" has been learned (recitation). These procedures have been expanded and enriched in their development and application, but the assumptions underlying the procedures have the fundamental simplicity we have just noted. The new concept, on the other hand, is developed according to the principle that learning is a *change in behavior correlated with experience*. Instruction is guidance of learning—a process of bringing about behavioral changes by selecting and organizing content or activities (often with the learner's full participation) and stimulating the interaction of pupils with the content or activities. It is this interaction which we call experience. And as we have indicated throughout this introduction, these new concepts in instruction have emerged because of the devlopments in the psychology of learning, *qua* psychology, and in the scientific studies of how children learn the various school subjects.

INSTRUCTION AND THE PSYCHOLOGY OF LEARNING

The contribution which the psychology of learning can make to educational theory and to method is considerable. This contribution has already been more than hinted at. We have said that "method" is being remade. The task does not entirely lie in the future. Gates, in a previous yearbook of this Society, listed what he considers to be "the chief factors that have contributed to modify general methods."[8] These are: (*a*) new conceptions of the nature of learning, (*b*) new conceptions of the child as learner, (*c*) clearer recognition of individual differences, (*d*) new conceptions of the role of the teacher, and (*e*) the role of the social setting. The first three of these factors are definitely psychological, and the fourth grows out of the first three.

On the other hand, the job of reformulating instruction in terms of the psychology of learning is still incomplete. The recent report on the future of psychology at Harvard contains an interesting paragraph on the relation of psychology to education.[9] The Commission holds:

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[7] The "unit" concept as defined by Burton (*op. cit.*) is one statement of the new methodology.

[8] A. I. Gates, "Contributions of Research to General Methods of Instruction," *The Scientific Movement in Education*, pp. 79-90, Thirty-seventh Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1938.

> Psychology should, and eventually will, supply a major part of the scientific foundation for the slowly evolving art of education. Dependable knowledge of the aptitudes and capacities of the pupil, and more important, his interests and enthusiasms, are incomparably more important for effective education of the individual from birth to maturity than are the so-called "subjects" now "taught" in our schools from nursery to university. Until we apply what we know of the psychology of learning to the individual, we shall be evading the essential issue, whether the evasion be via a free elective system or the mass exposure of all students in common to the same curriculum.

In its broadest connotation, psychology views instruction as a scientific as well as an artistic endeavor.

More specifically, one primary contribution that research in learning can make is to the area of educational objectives. Perhaps the most revolutionary reformulation of objectives that has ever been made in education is that which has been taking place as a result of the discrediting of formal discipline at the turn of the century following the research of James, Thorndike, Woodworth, and others. The concept of an educated man as one who has a "trained mind" has little educational significance today. Philosophically, we are coming to realize that the educated person is much more than one who knows. We now specify that the educated person possess useful skills and abilities, be interested in a variety of activities, manifest proper attitudes, hold value systems that are consistent with the Judaic-Christian ethic and the democratic way of life, and at all times translate these attitudes, interests, and value systems into *right* conduct. The "educated man" is defined psychologically in terms of the way he behaves. Psychology can make its contribution by showing that these educational objectives are but categories or classifications of ways in which we respond to environmental influences—that they are behavior systems that are a part of the adaptive mechanism of man, and that they occur or come about as a result of processes of maturing and of learning. Psychology makes a unique contribution to the process of formulating educational objectives by letting us know when the objectives can have educational reality in the sense of being capable of attainment.

Research in learning can make a second contribution to educational theory in the organization of the content and activities that make up educative experiences. The learning which is education differs from the learning which is life in the respect that it is formally organized. It is the unique function of the school so to order the experiences which children have that socially desirable learnings will take place. Children learn many things without schools, but there is no assurance that learning which is adapted to society's needs and aims will take place without schools. Thus it is an important task of the school to select and organize learning experiences of children and youth so that appropriate behavior will be assured. Our organization of learning content and activities has, historically, been Aristotelian. The organization has been an organization of logic. It has been contributed to learning experience by the person who has already learned. It is an organization "after the fact" of learning. A logical organization has beauty, simplicity, and a considerable utility. But psychological research has demonstrated that learning experiences are not necessarily logical. The organization which is best for the mature student is often unwise for the naive learner. Consequently, we now speak of a psychological organization for the learning experiences of children. It is in this area of instruction that psychology can make a second contribution.

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[9] *The Place of Psychology in an Ideal University,* p. 14. The Report of the University Commission To Advise on the Future of Psychology at Harvard. Cambridge: Harvard University Press, 1947.

Research in learning can make a third contribution by telling us specifically how the various aspects of behavior are learned. How is language acquired? How does a child learn to count? to type? to sing? How are attitudes of tolerance or prejudice acquired? When the environmental correlates of the learning of these behavior patterns are isolated, identified, and enumerated, then they may be controlled. This is the heart of the teaching act; its elusive secret is how to control the environmental correlates of specified behavior. Teaching can never do more than control the stimulational complex associated with learning. The response complex is inherent in the learner and can never be provided by the teacher; it can only be elicited by an environment which the teacher provides. Thus it is that psychology makes its third contribution by describing the nature of the experiences which are correlated with the learning of certain responses which mark the educated person.

THE PLAN OF THE YEARBOOK

Section I of this yearbook presents two chapters which outline the general nature of learning and the motivational basis of learning. These two chapters provide a frame of reference within which fall the more specific types of learning described in Section II.

Section II exemplifies a somewhat different approach to learning problems than is usually presented. The general title of the section, "How Children Learn in the School Environment," states the central problem. Children in the elementary- and high-school grades learn a variety of behavioral patterns. This section organizes these products of learning in terms which, while not necessarily mutually exclusive, are descriptive of a variety of generalized products. These are (*a*) motor types of activity, (*b*) information, concepts, and principles, (*c*) interests, motives, and attitudes, (*d*) social, emotional, and personal adjustment, (*e*) aesthetic types of behavior, and (*f*) principles and techniques of problem-solving. The authors of this section have, through principles and illustrations, shown how children acquire the types of behavior subsumed under the six categories just listed. An explicit statement which is descriptive of the type of behavior under discussion is an important feature of each of these chapters. Particular problems which school personnel face in providing for each of these desired types of behavior are also discussed.

The implications of these discussions for improved instruction are treated in Section III of the yearbook. A chapter which points out the implications for organization of instruction and for materials of instruction is followed by chapters which consider the implications for improved instruction in the major divisions of the school program of the early elementary grades, the intermediate grades, and the junior and senior high schools.

Section IV includes a summary of the preceding chapters and a redefinition of method in the school. It presents and defends the point of view that the classroom must cease to be a lesson-hearing room and must become a learning laboratory.

philosophy, became a discipline in its own right. During the second quarter of this century, psychology has looked elsewhere than to neurology and physiology for its underlying concepts. For many psychologists, the presumed interdependence of the neurophysiological synaptic-resistance reduction concept and the so-called laws of exercise and effect had a pleasant if specious finality. Today these neurophysiological concepts are less useful in formulating learning principles and in determining valid teaching procedures. Thorndike, who is mainly responsible for formulations of the laws of exercise and effect, and who himself has often speculated on the neurology of learning, finally admits, in the following passage, how little we really know about the neurophysiology of behavior: [3]

> The connections that words have in a person's experience produce modifications in his brain, but we cannot say with surety what these are. The neurones or nerve cells which are modified are receivers, selective or resonant in ways that we cannot yet describe. They are conductors, but conducting we do not know what. The orthodox theory is that the modifications in them by experience consist of changes at the points where one neurone transmits to another, but psychologists would question this. . . . . We cannot observe or infer what goes on in the brain in even so simple a case as when hearing "Come here" causes him (man) to approach and hearing "Go away" causes him to depart. What we observe are the probabilities of the occurrence of certain acts, thoughts, and feelings as consequences of certain hearings, seeings, and thinkings of words in certain contexts.

Today, then, we must search elsewhere than in neurophysiology for principles of guidance in directing learning.

Increased Significance of Cognition in Human Learning

Perhaps the most significant recent developments in the psychology of learning, particularly as they relate to instruction, are in the field of cognition, in the psychology of meaning, concept formation, and understanding, in what Judd called the higher mental processes. During the heyday of behaviorism, psychology neglected or disregarded the intellectual processes and their role in learning. Under the influence of Gestalt psychology and other field concepts, of the work of the social psychologists and those who study personality, and of developments in the related disciplines of education and social anthropology, a change in point of view in psychology has occurred.

Hilgard's final chapter in his recent book, *Theories of Learning*, is remarkable for the central role which it assigns to the cognitive powers in much of human learning. At one point Hilgard remarks that "all learning is to some extent cognitively controlled."[4] Cognition implies awareness or knowing, discovery or insight, as opposed to blind, mechanistic reacting. In this connection, Hilgard has developed the concept of the "provisional try" as significant in much learning. He states:

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[3] E. L. Thorndike, "The Psychology of Semantics," *American Journal of Psychology*, LIX (October, 1946), 613-32.

> Many learning situations require the selection of one or another possible modes of action in order to reach a goal. Because alternatives are selected one after another until the correct one is stumbled upon, this learning is commonly described as trial and error. . . . .
>
> The alternative (to a trial-and-error description) is that the original behavior is not the running-off of earlier habits in the new situation but a *genuine attempt at discovering*[5] the route to the goal. Past experience is used, but in a manner appropriate to the present. Such an interpretation makes the original adjustment a *provisional try*, to be confirmed or denied by its success or failure.[6]

Today the psychologist, particularly as he helps teachers with their problems and is concerned with educational values, recognizes that much of the learning which children do calls for the use of intellectual or "higher mental" processes, that is, for general intelligence and the use of those problem-solving activities which we call reasoning. How these thought processes operate in learning is important to teachers. Proper direction and control of these processes can affect transfer, retention, and utilization of learning, and this fact has recently been more fully realized. Chapter iv of this yearbook develops this notion in some detail. Recognition of the role of these processes in learning is recognition of the "cognitive" aspects of learning.

THE NATURE OF LEARNING

Learning has been too often considered, even by the more sophisticated teacher, as synonymous with memorizing or, at best, as the acquisition of knowledge or skill. While these are legitimately considered forms of learning, they are not the whole of it; they are not even the most important aspects of it. Any statement of the general nature of learning must include a discussion not only of the simpler kinds of learning, such as the formation of associations between nonsense syllables, connections between addition combinations and their sum, or the perfection of motor skill as in riding a bicycle, but also of the more complex and subtle behavioral changes which mark the development of skill in reading or in doing brain surgery, in use of mathematics as a system of quantitative thinking, in managing people, or in composing music. As Anderson has written in a somewhat different context,

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[4] E. R. Hilgard, *Theories of Learning*, p. 343. New York: D. Appleton-Century-Crofts, Inc., 1948.

[5] Italics ours.

[6] *Ibid.*, p. 336.

> A theory of learning should account both for the structuring of behavior and the selection and fixation of the final pattern, whether we consider the learning of nonsense syllables, simple conditioning in the popular sense, the acquisition of a complex skill, the change in behavior resulting from single or repeated emotional experience, or, even, the organization of a way of life.[7]

A Description of the Learning Process

Learning may be considered in its broadest sense as a process of adaptation. Through the process of learning, men acquire new ways of behaving or performing in order that they can make better adjustment to the demands of life. But we need to know what happens during the process of learning. How do responses change? How is behavior modified?

The essential elements in a learning situation are shown in Figure 1. They are: environmental stimulation of a living, motivated organism; incentives which when attained will lead to satisfaction of the motives; and at least a temporary blocking or inability of the learner to respond in ways that will enable him to gain the incentive. Motivation is assumed to be an inner state of need and is a necessary condition if the learner is to engage in learning activity.[8] Needs, wants, interests, and sets are terms which are used to refer to motivating conditions. Satisfaction of a motive may be blocked by the learner's inability to attain the incentives which could satisfy the need.

When satisfaction of a motive is blocked, the learner, under appropriate stimulation, makes a series of responses. These responses may or may not be approximations of successful goal behavior. They are "provisional trys." In Figure 1 the responses are labeled R_1, R_2, R_3, and R_n. At first, this behavior is variable; the responses may be extraneous or irrelevant, confused or inefficient. As learning proceeds, some responses are eliminated, and appropriate responses are selected. These successful responses are ultimately stabilized as variability is reduced. This reduction in variability is characterized by the processes of differentiation, integration, and generalization. The attainment of the incentive, which frequently involves seeing the relation between means and end, with the consequent satisfaction of the motive is the condition that determines which responses will be retained (learned) and which will be eliminated.

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[7] John E. Anderson, "The Relation of Emotional Behavior to Learning," *The Psychology of Learning*, p. 336. Forty-first Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1942.

[8] Chapter ii presents a detailed statement concerning motivation. More adequate definitions of this and other terms related to motivation will be found there.

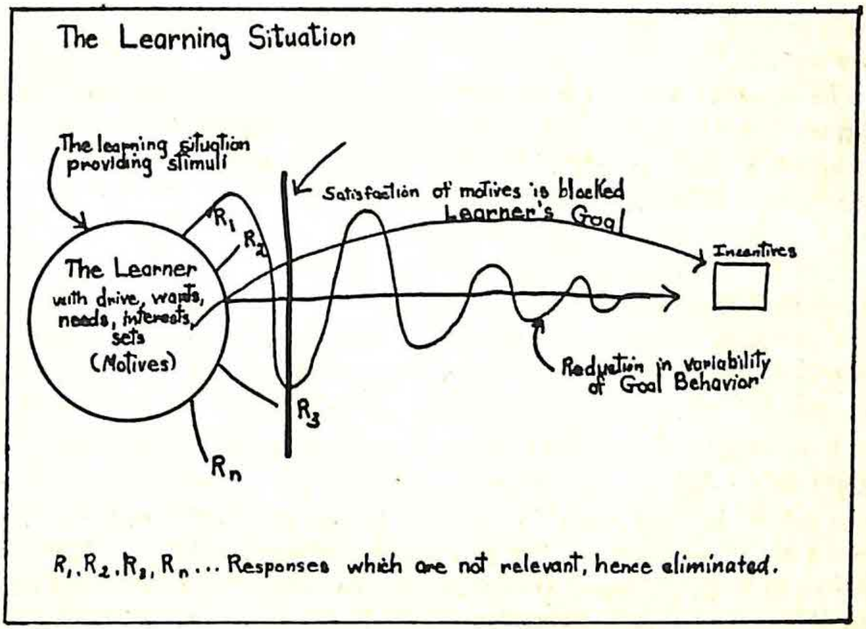
The Learning Situation
The learning situation providing stimuli
Satisfaction of motives is blocked
Learner's Goal
Incentives
The Learner with drive, wants, needs, interests, sets (Motives)
R_1
R_2
R_3
R_n
Reduction in variability of Goal Behavior
R_1, R_2, R_3, R_n ... Responses which are not relevant, hence eliminated.

Fig. 1.—Essential elements in a learning situation.

The circumstances under which learning, as we have briefly outlined it, takes place in its least cluttered although often more complex forms are most readily observed in nonlaboratory, or even nonschool, situations. As a child learns to ride a bicycle, to put a jig-saw puzzle together, to count and otherwise quantify his environment, to spend his money wisely, to tell time, to respect the property of others, to feed and dress himself, or to secure status in a group of his peers, the process operates as we have outlined it. Involved in the learning experience are: motives which are temporarily blocked; the incentive or incentives the attainment of which will ultimately lead to satisfaction of the motive; variable, often irrelevant behavior; and, finally, better organized and smoother behavior appropriate to the goal. All this is called the process of learning.[9]

It was pointed out above that behavior during the learning process becomes increasingly differentiated and at the same time more integrated, more efficient, and more generalized. What do these concepts mean?

The Concept of Differentiation. Differentiation is a process which has meaning for the biologist and mathematician as well as for the psychologist and educator. When the child who is learning to read distinguishes *big* from *pig* or *dig,* when he no longer calls all men daddy, when he knows the difference between a nickel and a quarter, when he no longer swings a golf club as he does a baseball bat, when mountains become something different from hills, when eighth notes and quarter notes are no longer played the same, when Wordsworth's poetry reads differently from that of Edgar Guest, differentiation has occurred.

In the early stages of learning, probably at all stages for that matter but more clearly in the earlier periods, both perception of stimulating circumstances and responses are obviously crude in relation to later refinements. At this stage, different stimuli, which are later reacted to differently, may have equivalent value in eliciting a response. For example, the child who calls all men daddy has not yet differentiated among men. Likewise, several responses to a given situation at first may seem equally appropriate to the learner, but with experience he may eliminate some of them. Or again, a diffuse (undifferentiated) response may be made in the beginning. The term *mass action* has been used frequently to describe this kind of reaction. But part of learning is to differentiate among stimuli and among responses, to come to know that a certain response is most appropriate or relevant with reference to a certain situation. The process by which the relevant responses, in terms of the stimulating situation and the motivation of the learner, come to be separated from the irrelevant is known as differentiation.

It is important for the teacher to understand the process of differentiation. He should recognize the normalcy of undifferentiated behavior in early stages of the learning process. Likewise, the teacher who asks for mature behavior patterns from the very beginning, e.g., adding without counting, has failed to take account of the principle of differentiation in his teaching.

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[9] Many experimental studies, especially those done under laboratory conditions, often fail to show a learning process that seems to fit our scheme. However, studies of children's learning in the school and studies of social learning often reveal a form which fits the pattern we have outlined.

The Concept of Integration. The term *integration,* as is true of the term *differentiation,* is used by the biologist, the mathematician, and other scentists as well as by the psychologist and the educator.

Integration is the process by which less related, less organized, less structured elements of a response complex become more related, more structured, or more organized. When a youth perfects a golf or tennis stroke that approximates good form, when a child understands and uses in his quantitative thinking the interrelatedness of 3×4 and $4 + 4 + 4$, when a high-school boy rejects the opportunity to cheat on an examination because he is perfecting an inner control of behavior which we call the development of ethical character, integration is taking place. This is simply to say that interrelationships are perceived and responded to and that larger and more completely organized response patterns are being developed.

The Concept of Efficiency. As learning proceeds, response mechanisms become more efficient. Attaining efficiency is essentially a matter of reducing the probability of incorrect responses, or, conversely, of increasing the probability that in a given situation where a given learned response should be forthcoming that this learned response will be the one elicited. It sometimes appears that with growth in efficiency nothing new is added, although there actually may be further differentiation and integration. When we attain efficiency in our behavior we seldom "miscue." Seven and four are always eleven; *t, h,* and *e,* are always struck in that order when we are writing "the" on the typewriter; the surgeon's knife does not slip; the banker's judgment is uniformly sound; the child's intelligence quotient is not miscalculated by the mental tester; in short, we can count on a given bit of learned behavior to emerge in a given situation. Efficiency is a matter of reducing the time and energy necessary to be expended in order to bring forth the appropriate response when we face a situation. Sometimes the concept "precision" has been used as we have used the word "efficiency."

Teachers traditionally have been well aware of the necessity of attaining efficiency in some educational abilities. They have sometimes erred in making it a requisite in all learning. Recently they have more often erred by misinterpreting statements concerning practice or drill so that attainment of efficiency or precision is minimized when it should not be. One who is learning to type for personal use need not attain a secretary's precision; but all should be efficient in the fundamental computational skills.

The Concept of Generalization. It has become a truism that an individual never faces a situation which is completely identical with one faced before. Notwithstanding this fact, an individual can react to successive situations with appropriate responses. We infer that a given response pattern has been made to fit a variety of circumstances for which the pattern is appropriate. When a response is thus elicited by a variety of situations we say the response has become generalized. Almost all learning, and certainly the great bulk of that for which the school assumes responsibility, has significance only as it is generalized. We want children to be able to tell the time out of school as well as in; or to tell it equally well from clock or watch; we want the child to spell not only in the spelling class but also as he prepares his history or science and when he writes personal letters. Whether our learning products are knowledge, skills, social attitudes, esthetic appreciations, or techniques of solving problems we want them generalized so that they have utility in as many as possible of the unpredictable exigencies of life. Learning does become so generalized as part of the normal processes of adaptation. The child who says, "I *runned* home when you called, Mother," gives evidence that generalization of response is a perfectly natural aspect of the developmental process in learning. Within recent years almost all who have studied and discussed the educational process have emphasized the importance in education of learning principles and generalized understandings and of applying what has been learned to a wide variety of normal-life problems.

We now repeat our paradigm concerning the nature of learning as it pertains to the child, in school or out. A child finds itself in an environment with stresses and strains which stimulate him. The child has to make adaptations to this shifting environment if his integrity is to be preserved. What adaptations he will make will depend in part on his immediate motives. There are objects or states which the child must attain if these motives are to be satisfied. These objects or states are called incentives. To attain incentives which satisfy motives becomes the child's goal. The path to the goal is blocked; the way is not clear. There is no ready-made response pattern that permits ready adaptation. Consequently the child tries this and that; he makes varied responses. (Thorndike's "trial and error" and Hilgard's "provisional try" are labels for this concept.) Some responses lead to the goal; others do not. Those which do are kept (learned) because of their appropriateness or relevance to the motive or goal. This establishment of the right response occurs under operation of some form of a "law of effect;" although, how this occurs precisely is still a matter of theoretical dispute. The entire process of interaction of environment and child is "experiencing," and the change in the child as a result of its experience is "learning."

Perhaps we are now in a position to understand McConnell's definition of learning when he writes:

> Learning may be defined as the progressive change in behavior which is associated, on the one hand, with successive presentations of a situation, and on the other, with repeated efforts of the individual to react to it effectively. Learning may also be thought of as the acquisition of ways of satisfying motives or of attaining goals. . . . . Learning occurs when old ways of acting are incapable of overcoming obstacles or meeting new conditions.[10]

Learning and Maturation

So far in this chapter we have not discussed learning as a psychological process which is sometimes considered as complementary to maturation. In theory, at least, it is possible to distinguish between learning and maturation, which have been called the two complementary developmental processes responsible for all behavior. Within recent years, certain leaders in educational thought have emphasized the significance of child growth and development for the educative process. Understanding the growth of children has been fully justified. There have, however, been some misunderstandings. The findings of child development have sometimes been interpreted by teachers and others to mean that the school's chief function is merely to provide a rich nurture for growth. They seem to assume that, if conditions are favorable, development occurs as the result of maturation or inner growth rather than as the consequences of carefully directed learning activities. For example, some have assumed that "reading readiness" or emotional and social maturity are developments which surely come with time and which one patiently waits for rather than teaches or works for.

The fact is that all forms of development depend in a degree upon sheer inner growth or maturation, upon nurture (meaning food, bodily care, physical surroundings, etc.) and activity. Under activity is included all that a child does, thinks, and feels, whether initiated and

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[10] A. I. Gates, A. T. Jersild, T. R. McConnell, and R. O. Challman, *Educational Psychology,* p. 299. New York: Macmillan Co., 1942 (revised).

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sustained by himself or by the guidance or instruction of parent, teacher, or another child. While in science it is customary and important to recognize and to try to estimate the relative roles of maturation and environmental influence or of maturation and learning, in practical life it is very difficult to do so in all but perhaps a very few cases. The teacher is concerned typically with complex patterns of behavior such as those involved in walking, writing, reading, appreciating a literary selection, conducting an insightful and open-minded discussion of a social issue, or working with a group in a friendly co-operative way. All these abilities comprise a complex organization of many components, each of which has been the outcome of years of earlier maturation, general nurture, activity in the narrower sense, experience in the broadest sense, and guidance and teaching. In such cases it is impossible to determine the exact contribution of every "native" or environmental factor. What we can do, however, is to recognize certain characteristics and principles of development and the significance of developmental status.

First of all, it should be recognized that the effectiveness of activity or experience, whether directed by the child or a teacher, depends upon the stage of development attained at the time. For example, in the process of learning to read, instruction by the teacher or effort by the child is likely to produce little or no progress until the child has reached a certain stage of development or "state of readiness"; when this stage is reached, progress may be pronounced. A most fruitful line of investigation now vigorously pursued is that of finding means of determining a child's stage of readiness for all types of learning. Information is already available in many areas to enable teachers to "strike while the iron is hot," rather than too early or too late.

In typical cases, moreover, readiness is a complex of many components, all progressing through the combined influence of maturation and learning, and themselves ready in various degrees to be promoted more rapidly by good teaching. For example, the child who is not ready to begin reading may achieve the necessary status more quickly if he is given instruction in such component abilities as detecting the common sounds, noting the visible features of small word-like characters, following the thread of a story, and getting the meaning of pictorial illustrations. On the other hand, some component abilities, such as discriminating certain types of phonetic elements or understanding certain abstract word meanings may be advanced but slightly by teaching. In any event, knowing the nature of the child's developmental pattern enables the teacher to adjust her teaching to secure maximum progress. For example, if the child's auditory discrimination of words is poor and not easily improved at the time, the teacher may choose a procedure which capitalizes on a superior ability such as visual analysis.

The component abilities referred to above are themselves complex patterns. The failure of instruction to advance any of them perceptibly at a given time may be due in some instances to the fact that the pupils are still too immature, a condition which time, well employed, will improve. In other cases, it may be found that constitutional limitations account for the failures. For example, John's poor visual co-ordination may gradually disappear as he lives and learns, but his red-green color blindness or his partial tonal deafness will not. Moreover, Mary's superiority to Fred in verbal insight and retentiveness (verbal intelligence) may be an expression of a deep-seated constitutional difference which is likely to continue indefinitely. Mary and Fred will grow through rather similar developmental sequences, but Mary's advance will be more rapid, and her lead over Fred will become increasingly great. As a consequence, the optimum time for certain educative experiences in terms of age will be different for the two pupils.

This, in brief, is the relation of heredity to learning. To say that the teacher must take heredity or maturation into account is merely to say that she must learn to adjust her instruction to the pupil's stage of development, to his constitutional characteristics, and to the prospects of improvement at those times which fall within her range of action.

From the many generalizations emerging from the vast array of technical studies of maturation, heredity, physical and social environment, learning and education, and the relationships among them, only three more will be mentioned in this section.

Although interest, enthusiasms, and purpose are potent aspects of readiness and ability and are themselves subject to influence by teaching, they alone are not always a sure indication of total readiness or ability for learning. Sometimes, for example, readiness springs from the enthusiasm of others or from the mere desire to do what others enjoy.

Although both interests and competence tend to progress continuously over two or more decades, they are subject to short and long periods characterized by upward spurts, leveling off, decline, or regression. For example, a boy may be completely absorbed in baseball for a time, only to drop it cold for equal enthusiasm in marbles. A girl may reveal amazing interest and growth in social and emotional maturity in her early teens but, on occasions, regress to the emotional pattern of her childhood. Similarly, an excellent baseball pitcher may rise quickly to new heights or "lose his form" in a "slump" lasting for days or months. The teacher must expect such episodes and be prepared as best he can to capitalize on and to mitigate them, as the case may be. Obviously, mere routine, mass teaching conducted with little understanding of the components and characteristics of individual patterns and courses of development, does not fulfil the possibilities of teaching now revealed by scientific study.

Although many aspects of development of greatest significance in life as a whole are learned out of school and educators are sometimes disposed to think of their responsibilities as those prescribed in the curriculum of studies, growth is the evolution of a unique, highly organized personality whose behavior pattern embodies learnings from all sources. The apparent exception—the maladjusted person, disorganized by conflict—represents an unfortunate pattern of incompatible components.

Learning situations in and out of school interact. The child's success or difficulty with the family or neighborhood group may originate in events in his history class, and his accomplishments or failures in mathematics may reflect his relations with after-school companions. Learning in a specific area is thus a product not merely of specific instruction but of a developing general pattern of behavior. Even to teach arithmetic, the teacher must have good psychological insight and expert skill in child guidance. It is for these reasons that this yearbook for teachers will explore the processes in learning in all the phases of human development.

Learning and Experience

It has been said repeatedly that learning results from experience. The meaning of this word "experience" is important if we are to understand fully a definition of learning as change resulting from experience and if we are to apply it wisely. The word *experience* has been used in an apparently esoteric sense as a modifier of certain pedagogical nouns, e.g., in "experience curriculum" and "experience units," so that many persons have been confused about its meaning when they have read that learning results from experience. Is experience some special kind of activity, process, or response which does have some esoteric meanings when used in connection with learning?

The answer is no. Experience is simply an interaction of a child, adult, or other living thing with an environment. When a student has experiences, he is stimulated and reacts. That is all. The environment is filled with energy systems which interact upon each other. The living human being is one of these. As the sun generates light and heat and other bodies reflect it or store it and later release it, these energy rays impinge on our eyes and other sense organs. As a result we react. Other energy systems impinge on us in other ways. Experiencing is simply seeing, hearing, feeling, tasting, smelling, and so on, *and* perhaps *doing something* else as a result. We learn because things happen to us, and we do something in return. There are no special kinds of learning that take place through other processes than experiencing. It is *only* through experience that we learn.

The significant point is that *the kind of learning which takes place is a result of the kind of experience which we have.* In the traditional school with its emphasis on memorizing as the learning process and with verbal statements of factual information as the product, experience was present. If it were not, there would have been no learning. But the experiences, the kinds of stimulation that were present in the traditional school environment, were of the character that made memorization the learning process and factual information the learning product.

When it is said that the modern school is concerned with "experience," what is implied is that the *quality of experiences* which children have determines *the quality of learning* which takes place. The phrase "learning experiences" is probably a tautology. All experiences are learning experiences. Because quality of learning is important to the educator, the quality of experience which children have in school is important to him.

Another closely related phase of this problem is one of understanding properly the meaning of activity as it is related to learning. Again, the educator has used this word to modify both "curriculum" and "unit." A learning principle, and a perfectly sound one, is that we learn what we do, or that we learn the responses which we make, or that we learning by doing. The logical inferences, or at least they seemed logical, derived from this concept that "we learn what we do" seemed to be of this order: We learn by doing, doing means activity, we learn through activity, activity means action, action means overt, physical activity. The misinterpretation which occurred in *this* setting was that activity is always overt, or that physical activity must be present if we are to learn. However, learning activity can be and is implicit; i.e., it can occur without overt manifestations. When children sit quietly listening to music, college students listen to a lecture, or the scientist sits contemplatively at his desk, there need be no overt manifestation of an intellectual or emotional activity that is changing the person involved. These persons are not passive; they are learning, even though externally quiet.

The concept of experience simply means that the learner is interacting with an environment, that he is not quiescent. The learner must be doing something if he is to learn, but this doing may be implicit as well as overt.

The nature of experience as we find it in school and as it leads to learning is aptly described in a state curriculum bulletin in these terms: [11]

> The stuff of education is identical with the kind of experience we have just described. In the primary grades the child studies the environment of his immediate community. He visits the dairy, the grocery store, the post office. He learns how to cross streets safely. He visits the farm and, with his teacher, writes a story about it for his reading lesson. Such are the curriculum experiences at the primary level.
>
> In the fifth grade the child may learn how man has measured time. He reviews the experiences of people in the ancient world; learns how the calendar was developed, how people told time. He learns about the inconveniences of our present calendar and the proposals for its reform. He discovers how important it is for him personally to have accurate knowledge of the time so that he arrives at school on time. He reads about calendars. He makes oral reports. He learns Roman numerals and the social applications of arithmetic. Thus, again, curriculum is experience.
>
> Children in the upper grades become acquainted with current affairs. They listen to the radio, read the newspaper and their weekly reader. The United Nations is discussed in American history. The failure of the League of Nations and America's role in that failure is reviewed. The atom bomb is explained in the science class, and the need is discovered for some form of international control. The child is again learning through interaction with his environment—he is learning through experience.

The Learning Product and Learning Process

Today the teacher asks the specialist in learning not only how children memorize or how they develop skills but also how children form attitudes, how they develop appreciations—in fact how they may acquire all the behavior which marks the educated person. The psychologist, in turn, has been giving increased attention, as we have already pointed out, to the learning of all types of behavior. The outlines of the chapters of Section II of this yearbook represent one way in which these types of behavior may be categorized. These categories—motor activities; concepts, meanings, and generalizations; motives, interests, and attitudes; social and emotional controls; esthetic types of behavior; and techniques of problem-solving—are equally useful to the teacher and to the student of the psychology of learning. These concepts represent what have been called learning products.

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[11] *A Guide for Better Instruction in Minnesota Schools.* Curriculum Bulletin No. 1. St. Paul: Department of Education, State of Minnesota, 1946.

The products of learning may be contrasted with what may be called the process of learning. This distinction between product and process has considerable significance for the teacher. By *process* is meant the way in which the learner operates in order to attain certain learning products. Process refers to the *way* in which one learns. But it also has a larger significance because process, a way of learning, itself becomes established, and a particular way of learning with its consequent meaning for a way of attacking new problems is often as important to an individual as a particular product.

For example, in the field of science there are certain knowledges and skills that result from learning. Knowledge of the elements, the physical properties of matter, skills of manipulation, and so on, make up a content of science that is learned in science classes. But instruction in science should also lead to what is called a scientific attitude and a scientific method of solving problems. These have their more important manifestations, however, not as products but as the way the scientist proceeds as he learns. Its essence is an experimental, problem-solving approach to situations. And for the average learner this approach *is developed as a way of learning*. This experimental way of going about things is probably a more important educational objective than is the attainment of a given knowledge content or set of technical skills.

Many of the points of view concerning how learning takes place—by trial and error or through insight, as examples—represent not so much differences in theory as descriptive concepts for the ways children actually learn under different conditions. When children are thrown into a complex, confused situation and are expected to learn with a minimum of guidance, they must proceed by trial and error. When the situation is more highly structured and a proper set is established, the learning may be insightful. The processes of learning are basically different. Children may learn by processes which we call, under varying circumstances, rote learning, conditioning, trial and error, goal seeking, insightful learning, meaningful activity, or problem-solving.

It seems sound that the school should attempt to stimulate learning through processes which are meaningful, insightful, or problem-solving in character, because this kind of learning behavior is especially valuable for children and adults in our society. Consequently, the experiences which children have in school should be those which require appropriate learning processes.

Transfer of Learning

Any account of the general nature of learning must treat its transfer to new situations. The problem of transfer of training or of learning has been discussed many times. Transfer provides an omnipresent problem to teachers of many of the subject-matter areas; at the same time, the assumption that transfer occurs provides a convenient defense for many of these same subjects. The psychological generalizations concerning transfer are just as paradoxical. Although we are still arguing as to whether transfer occurs because of identical elements or components in learning situations or whether there is transfer because the learner can and does generalize his behavior, McGeoch has shown that the concepts are really one. McGeoch wrote:

> We can say with assurance that *transfer is a function of the relations between antecedent or already learned activities and subsequent activities in process of being practiced.* The relations between these two groups of activities include all of the phenomena subsumed under the two theories of identical elements and generalization. . . . . The two theories are not mutually exclusive and readily become parts of the more general interpretation that transfer is a function of the relations between the activities from which and to which transfer occurs.[12]

The nature of the theories and conditions for transfer as they have been formulated in educational psychology are so well known that they are not treated here. What is not so well known and even less appreciated is that a philosophy of education and a theory of transfer are interdependent. Much of the present utilitarian philosophy of education, expressed succinctly in the simple statement that we should train people directly to perform the acts which they will subsequently be called upon to perform, is derived in great measure from Thorndike's work and its later confirmation on certain transfer problems. A "great books" education, on the other hand, also has implicit within its basic philosophy a theory of mental organization and transfer of learning akin to faculty psychology, with "reason" the most exalted of the faculties. Much of the confusion existing in education today comes about because of failure to reconcile an educational philosophy and the generally accepted facts concerning transfer.

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[12] J. A. McGeoch, *The Psychology of Human Learning*, pp. 438-39. New York: Longmans, Green & Co., 1942.

Other things being equal, that education is best which has maximum transfer value. Transfer is at a maximum when old learning and the new problem situation are interrelated because of common or similar elements, components, factors, stimuli, or relations, or when they require common or similar skills, sets, attitudes, knowledge, appreciation, or other response patterns. Often these common features exist, but they are not perceived or recognized by the learner; consequently, they fail to support transfer. It becomes a major teaching task to bring about awareness or insight into the interrelationships of old learning and new learning tasks. This is most readily achieved when learning is so directed that experiences are meaningful, result in the formulating and understanding of principles, lead to a comprehension of the rational basis of skill (e.g., understand the "why" of a particular form in athletic performances), or otherwise lead to an insightful structure or organization. In attempting a reconciliation of the theories of identical elements and generalization, one might say that when learning causes one to generalize the common features of varied experiences, learning will have maximum value. It seems clear that learning which is cognitive in process and control is more likely to have varied utility than learning which is mechanically associative. The most brilliant illustration of this concept is found in the development of the "meaning theory" for teaching arithmetic.

THE DIRECTION AND GUIDANCE OF LEARNING

In Section II of this yearbook, there appear detailed statements as to how pupils acquire various modes of response. How learning may be managed in order to develop these modes of response is either explicitly stated or implied in each of the statements. In Section III many suggestions appear for the control or guidance of learning in the school environment. However, it seems useful here to lay down certain directions which this management or control of learning may take.

The direction and guidance of learning is one of the major tasks which the teacher faces. There is both quality and economy to be considered in this management.

We can direct learning by determining the kind of experiences which children are to have. Not all experiences are equivalent. What experiences teachers should provide for pupils cannot be determined without consideration of the pupil and of the end products—the nature of the child at the time as well as the educational objectives to be attained. But the only control we have over product is through experience. The teacher can never impose the product directly. It is the pupil, not the teacher, who is the active learner. The major control which the teacher has, then, is to make sure that the pupils have certain experiences and also to make sure that they do not have certain others. This point is obvious in certain areas. A child can only learn to play the piano or type as he has experience in playing the piano or in typing. Many teachers (and parents) have, however, not been able to understand the equally valid statement that children learn to make decisions only as they face situations in which they must make decisions, that they achieve control over their emotions or learn how to work co-operatively with others as they have other experiences in which emotional control or co-operative work skills are relevant.

Teachers can direct and guide learning, and consequently improve it, by encouraging pupils to develop a method of attack in learning situations and to develop skills and attitudes that are often first-steps in the attainment of certain end products. The science teacher must lead his pupils to develop the ability to read science materials. The foreign-language teacher should lead pupils to realize that translating a foreign language is not a process of making one-to-one associations between foreign words and their presumed English equivalents but that translating is a process of expressing in an equivalent English idiom meanings which have been recorded in a foreign tongue. The shop teacher stresses skill in reading blueprints. The arithmetic teacher leads the pupils in a process of discovering number relations which become tools in new learning. The reading teacher demonstrates techniques for attacking new words. All of these illustrations emphasize the point that the teacher should anticipate the learning of one kind of product at a later date by providing earlier an appropriate process or tool.

Teachers can improve learning by influencing motivation. This involves both managing the initial want or need or other conditions of the learner which prompt him to become active in the learning situation and manipulating the goals, incentives, objects or states which the pupil wants to attain and which will satisfy the initial want or need. Motives are in large part learned. Consequently the teacher can in the present develop motives which may be used in the future.

The way in which motives operate is explained in chapter ii; the way in which they are learned is developed in chapter v.

Teachers can direct and guide learning by managing the amount, kind, and distribution of practice. As with so many other aspects of learning, teachers have been confused and have often misinterpreted recent statements concerning the role of practice in learning. Stroud, in a previous yearbook of this Society, made an excellent statement of the place of practice in learning. He pointed out that, while practice is not a sufficient condition, it is an essential condition of learning.[18] Practice alone does not produce learning, but we do not learn without practice. When educators and others were inveighing against certain educational procedures that are called "drill," they were inveighing against the use of drill as the sole device for bringing about learning and against drill which was irrelevant to the attainment of significant objectives. Our present knowledge of how we learn tells us to use practice as a method for fixating and making precise or efficient those things which other learning procedures have lead us to understand. For example, there is a place for drill in arithmetic, but it follows and should not precede the development of understanding of the processes to be learned. The teacher can control learning by presenting practice material which is important in developing the skills and abilities which children should be learning. This practice material should be distributed so that these skills and abilities are maintained.

The best practice may be thought of as rich experience. As children have abundant opportunity to use the skills and abilities they are in the process of acquiring in situations that are important to them, they are practicing. They are practicing as they are experiencing. Teachers should become skilful in creating classroom experiences which provide optimum opportunity for practice.

Teachers can improve learning by recognizing and using certain principles that relate to retention. Both teachers and the learning specialist have been concerned with retention or its negative aspect, forgetting. So much that we learn seems so soon forgotten. The early naive answer to the question, "Why do we forget?" was given in terms of lack of practice of the skill or ability in question. "Disuse" was the answer. There seemed to be a progressive deterioration with passage of time. While the disuse theory seems to have a certain validity and is often a practical answer, it does not help us solve some of our major learning problems. Forgetting seems to be an active process, something which occurs because something has happened either to the situation which originally called forth the response or to the learner since he learned the response he now seems to have forgotten.

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[18] J. B. Stroud, "The Role of Practice in Learning," *The Psychology of Learning*, pp. 353-76. Forty-first Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1942.

We have just said that sometimes we do not make the presumably learned response because the situation has been changed. Forgetting has occurred because the stimulus has changed. To the outside observer the essential features may seem to be the same in two situations, but to the child making the response they are not. A word learned as print is not the same stimulus when it is presented to the child as script, although to the adult the difference between print and script has long since ceased to be relevant. Faces are altered with time, and our forgetting of names may be a change in the person met rather than in the person attempting to recall the name.

Sometimes we do not make a presumably learned response because of a particular "set," which is not conducive to recall. The situation has not changed, but the learner has. This change may be temporary or permanent. If a student has been reading science material as a part of serious study and then turns to fiction, he may find his "set" for the study of science slows him down in reading fiction until he has re-established a reading set that is more appropriate. Set is an aspect of motivation. It is a state or condition of the learner that causes his responses to be of a particular kind. If the set is wrong, responses which are made may be of the character which we call forgetting.

Some psychologists hold that forgetting may be the result of repression or blocking. We forget some things because it may be "unpleasant" to recall them. Our ego is so involved in some situations that "correct" behavior in terms of learning may at times cause more problems than it will resolve. We have repressed our memories of or our feelings for certain situations. As a consequence, we have a "block" and seem to have forgotten.

Probably the most important explanation of forgetting is that associated with interference, or in technical terms, retroactive inhibition. New learning sometimes gets in the way of or interferes with old learning. The conditions under which this interference is at a maximum and minimum have been studied so that we state with some assurance a few principles which will, if observed, minimize forgetting.

Things learned are best retained, i.e., are subject to least interference, when they are well structured or organized. This is probably why facts are more likely to be forgotten while principles are better retained. Facts are too frequently isolated. Principles represent a high degree of structure. Principles involve organization of data. When material is seen in all its interrelatedness with other material and when it is learned and used as a part of an organized body of material, it is best remembered. Likewise, new learning is least apt to interfere with old learning if the new learning is itself organized. The quality of organization is one aspect of meaningfulness, and it is a psychological truism that meaningful material is easiest learned and best retained.

When material is thoroughly learned it is less subject to interference. It seems obvious that well-learned material would be least forgotten. But the application of this principle has not been so obvious. When teachers present an abundance of material which can only be learned sketchily at best, they are setting the stage for forgetting. This is in contrast to the selection of a smaller body of content or fewer activities for which there is time for thorough learning. We err at all levels of education in providing too many concepts to be understood with too little time for thorough learning of them.

We have written that teachers can direct and guide learning by (*a*) selection of appropriate experience, (*b*) attention to study skills and other methods of attacking learning problems, (*c*) development of appropriate motives, (*d*) management of practice, and (*e*) attention to conditions which may minimize forgetting. A warning, perhaps, needs to be sounded. When a teacher comes to understand the general nature of learning and the more specific aspects related to the teaching of particular skills, understandings, and other behavior patterns, it should not be assumed that he can then accomplish educational miracles in directing children's learning. Several years ago Stroud wrote in another yearbook of this Society this cautioning statement:

> Educational theorists have promised much. Teachers who see so little result from so great expectation make a good market for those who profess at last to have discovered the royal road to learning. Perhaps nearly all those whose business it is to teach and those whose business it is to learn will agree that up to the present no easy road to learning has been discovered. Perhaps also those who have given some attention to the nature of ability and the learning process will agree that such a discovery is not in sight. . . . . There is little prospect that some feat of educational engineering will enable our eyes, ears, brains, and hands to work with twice their present efficiency. Learning is slow and tedious. Much that is learned is soon forgotten. These

things are so, not because the teaching is bad, but because the learning apparatus is what it is.[14]

Teachers are not asked to understand learning so that they then can "teach twice as much in half the time" or perform other spectacular feats of educational engineering. They may, however, legitimately be expected to direct the learning of children so that maximum achievement of the goals of education can be attained and that a "learning indigestion" does not result.

CONCLUSION

How, in the light of the present evidence and its interpretive literature, do children learn? The following series of statements in a sense describe, somewhat simply it is true, the general nature of learning:

1. Learning may be defined as a change in behavior which results from experience.
2. This change in behavior "is associated . . . . with successive presentations of a situation, and . . . . with repeated efforts of the individual to react to it effectively."
3. Learning takes place when existing responses are inadequate to meet a situation; it often takes on the character of problem-solving.
4. Learning is a function of motive—incentive conditions. Learning takes place when there is: (*a*) a need, drive, or motive, and (*b*) an appropriate incentive or goal, the attainment of which will satisfy the motive.
5. Learning is often a change in the organization of behavior.
6. Learning is developmental; time is one of its dimensions.
7. Learning is a process, not a product.
8. Learning is a function of "readiness" to learn, that is, it is a function of the mental, physical, educational, and social maturity of the learner.
9. While it is true that we learn what we "do," transfer of learning is also a fact.
10. To the educator, development of meanings and understandings is a central problem in learning.
11. There is no "royal road" to learning.

The significance of these statements for instruction follows:

1. The objectives of education, hence of instruction, can and may well be expressed in terms of individual behavior.
2. Essentially, instruction functions to change individual behavior, i.e., to bring about learning.
3. An instructional program must provide experiences, activities, or content which will permit the learner to acquire all the types of behavior which make an educated person.

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[14] *Op. cit.*, p. 357.

4. Instruction, if it is to be effective, must arouse (motivate) the learner to some active form of response.
5. Instruction must provide some goal or objective (incentive which satisfies the motive) toward which the learning activity is directed.
6. For efficient learning, instruction should be so planned that the activities and experiences of the learner are continuously related and interrelated into larger, more meaningful, more inclusive reaction patterns or hierarchies of understanding.
7. Instruction must provide only that content or those activities which a learner can reasonably expect to learn in terms of his mental, physical, and social maturity and the time at hand.
8. Instruction must provide sufficient repetition or drill to make precise and efficient those responses which need to be made precise and efficient.
9. Instruction is sound to the degree (other things being equal) in which it assists the learner to transfer the results of learning to wider areas of experience.

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CHAPTER II

MOTIVATION IN SCHOOL LEARNING

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Introduction

The teacher attempts both to understand the motives of children and to capitalize upon them as central factors in learning. Because motives are rich in variety and subtle in expression, the teacher's task is a difficult one. Two children doing the same thing may be expressing different motives; two children doing different things may be expressing the same motive. To understand motives is both to observe and to interpret what goes on for an individual child as he plays, competes, co-operates, or withdraws from contact with others. To make use of motives for the purposes of the school requires not only that the motives serve the purposes of learning but also that the motives themselves be shaped and modified in desirable directions. We not only make capital of children's interests but we seek to direct those interests along appropriate lines. It is this general program with which the present chapter is concerned. First there will be some general observations on the motives of children, then will follow a discussion of the relationships between motivation and learning. Next, consideration will be given to some of the more specific motivational problems at the administrative, classroom, and interpersonal levels. Finally, the chapter returns to a summary of the work of school people in providing well-motivated learning situations.

Teachers and psychologists have always given a place to causes underlying behavior and to factors initiating and reinforcing learning. Early in this century many believed that "instincts" determined much of children's behavior and learning. A little later the influence of biology and animal psychology stressed the importance of such needs or drives as self-preservation, sex, food-getting, and avoidance of pain. Of course neither of these schools of thought was of much help to a teacher of thirty-five children who were not too concerned about the Oregon Trail or remainders in long division. It soon became apparent that secondary or social motives, possibly derived from primary urges, are the more important ones for the teacher.[1]

The nature of motives and their relationships to learning are considered more fully in later sections of this chapter. Enough has been said here to suggest that teachers have always been aware of the importance of motivation in learning, but accumulating evidence now provides an increasingly valid basis for understanding it and planning for it as part of children's school activities.

This chapter offers no panacea for all the ills of indifference, dislike, and rebellion encountered in children placed in unsuitable school environments. If there is any conclusion from recent research of which a teacher may be sure, it is that there is no known formula or infallible set of procedures to motivate all pupils at all times. Enough evidence has been accumulated to suggest that the whole motivational setting is more important than isolated attempts to energize learning and that certain incentives sometimes used by schools, such as sarcasm, grades, and honor rolls are of doubtful value or even of definite harm. Because an incentive is effective does not necessarily mean that it is good, as seen in the larger context. The evidence seems rather clear, too, that motivation is not something applied apart from the learning situation but is an intrinsic part of it. While in this chapter we stress the need for teachers to know the child's or the adolescent's developmental status and interests, we recognize also that the school must attempt to maintain some sort of balance between the immediate, compelling needs and interests of pupils and the demands, both immediate and more remote, of the society in which the pupils and teachers live.

Children's Motives

When we talk about motivation or motives we are talking about any of the circumstances which result in the energizing, selecting, or directing of conduct. Physiological needs and drives, incentives, goals, wishes, purposes, interests, rewards, punishments, fears—all must be considered. Some of these depend upon the fact that children are young mammals, with the biological needs common to their kind. Some depend upon the fact that the children we know grow up in our culture, where from the earliest days certain demands have been made upon them, certain roles assigned to them. The cultural consequences are made more baffling because the different subcultures in our country expect different things of children.[2]

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[1] Despite his emphasis upon unlearned instincts, McDougall, in his treatment of derived emotions and sentiments, gave one of the most cogent discussions of the way in which important motives are learned. Cf. William McDougall, *Outline of Psychology* (New York: Charles Scribner's Sons, 1923). A typical later account of derivation of social motives from organic needs is that by Shaffer. Cf. Laurance F. Shaffer, *The Psychology of Adjustment* (Boston: Houghton Mifflin Co., 1936).

A word ought to be said, too, about teachers' motives. What teachers expect of children, the sorts of things which make them comfortable or raise their anxieties, affect both what they can understand in children and what they can permit children to do. Because most teachers represent a middle-class culture, their ideals often pose difficulties in the way of understanding lower-class children. As we shall see, many important motives are personal-social ones, in which two individuals are commonly involved. Therefore, the motives of children cannot be detached from the motives of the important adults about them. In the school, the teacher represents such an important adult.

A Vocabulary Appropriate to the Discussion of Motivation

A varied and somewhat confusing list of terms descriptive of motivation has come into use, in part reflecting the different schools of psychology. Thus, a behaviorist is likely to describe motivation in words differing from those of a psychoanalyst, even in a case in which there is no disagreement over facts. In what follows, we have attempted to use a set of terms as "neutral" as possible, that is, terms which are closely related to a matter-of-fact or naturalistic description of motivation as we find it. The following definitions are adhered to in the discussion:

Motivation: A very general term for describing need-satisfying and goal-seeking behavior. It includes physiological drives, unconscious motives, clearly formulated purposes, ideals, etc.

Motives: A very general term for whatever states or events within the organism (under appropriate circumstances) initiate activity or regulate activity in relation to a goal. Hence motives include *drives, needs, urges, impulses, sets, predispositions, values, purposes,* etc. The word *need* is most nearly synonymous with *motive.*

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[2] W. Allison Davis and Robert J. Havighurst, *Father of the Man: How Your Child Gets His Personality.* Boston: Houghton Mifflin Co., 1947.

Incentive: An object or situation in the environment capable of satisfying an aroused motive. Food is an incentive in relation to hunger as a motive. A safe place is an incentive in relation to pain as a motive. *Reward* and *goal-object* are synonymous for incentive, but the word *goal* is used somewhat differently. We may think of the incentive as something which can be manipulated by the teacher in a direct manner not possible with motives.

Goal: The goal of the learner is the end-state which gives direction to motivated behavior. It must always be defined according to the aroused motives of the learner. Because the acceptability and satisfying consequences of an incentive depend in part upon the goal-expectations of the learner, the incentive and the learner's goals have to be distinguished. The goal is what the learner is seeking rather than the incentive that the teacher is providing. They may have much or little in common.

Level of Aspiration: A goal that the individual sets himself, which he expects to reach or wishes very much to reach.

Intrinsic and extrinsic relations between tasks and goals: The relationship between goals and the learning tasks related to them may be described as intrinsic or extrinsic, depending upon the logical relationship between the task and the goal.

The relation between task and goal may be said to be *intrinsic* if the incentive conditions are functionally or organically related to the activity. Thus the satisfaction derived from hearing a program over a self-constructed radio set is a satisfaction derived from putting the radio to its intended use. This is an intrinsic satisfaction, because the goal is inherent in the successful completion of the task of construction.

The relation between task and goal may be said to be *extrinsic* if the incentive conditions are artificially or arbitrarily related to the task. Thus, if a prize is to be awarded to the first boy to complete his radio, the desire for the prize is extrinsically related to the task of radio-building.

Because motivational situations are complex, the relation between task and goal is often at once intrinsic and extrinsic.

A few additional technical terms will be introduced as needed, but the above basic vocabulary suffices to avoid confusion at the outset. It should be pointed out that allowance is made for motives which are not clear to the learner, referred to as unconscious motives. By recognizing that motives are often disguised, we avoid the pitfalls which arise from taking stated purposes and ideals at their face value. Over-emphasis upon verbally acknowledged motives leads to moralizing about behavior instead of making a more penetrating psychological analysis.

Personal-social Motives

Even the primary needs (hunger, thirst, elimination, etc.) have to be satisfied in socially acceptable ways, so that the motivational situations with which the teacher is concerned are predominantly those involving *acquired* or *secondary* motives.[3] These are the motives of an individual which have arisen in the course of his lifetime or have been changed through experience in such a way that they affect his conduct even though some other individual might not be affected by them in the same way or to the same degree. Man's behavior may be regulated by all sorts of apprehensions, anxieties, aspirations, and rituals which have arisen during his lifetime. It is an interesting question whether or not the acquired motives rest upon and derive their energy from basic tissue needs. However this question may be answered theoretically, the acquired motives are, from a practical standpoint, so strong as to be prepotent over the basic needs upon which they may rest. The miser may at first seek money for the need-satisfying things it can buy, but later he may deny himself these goods in order to see his money pile higher. A motive is as strong as what it will cause the individual to do, whatever may be its origin.

In the days when it was fashionable to provide lists of "instincts," these lists served to catalog the motives. More recently, authors have attempted to list the fundamental human motives or needs. The lists vary greatly in length, from Thomas' four wishes to Murray's twenty-eight psychogenic needs.[4] The reason that such lists have differed from one author to another is easily understood, once the richness of acquired motives is comprehended. Any list is a summary for convenience; that one list differs from another does not mean that we know little about human motives. When, in what follows, we spell out a few representative personal-social motives, the precise ones chosen for discussion and the names assigned them are unimportant. Each represents a kind of motivational situation which must be worked out one way or another by every child.

The Need for Affiliation. The need to participate in group life, to affiliate one's self with other people, probably arises out of the dependency of the young child upon the adults who care for him. The need may originally be satisfied by other members of the immediate family, but all the arrangements of civilized life make it necessary for the individual to come to feel himself eventually a part of the larger community.

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[3] For a good discussion at the level of general experimental psychology, see Neal E. Miller, *Acquirable Drives and Rewards* (mimeographed, 1948). To appear in S. S. Stevens (editor), *Manual of Experimental Psychology*. New York: John Wiley & Sons.

[4] W. F. Thomas, *The Unadjusted Girl* (Boston: Little, Brown & Co., 1923); Henry A. Murray, et al., *Explorations in Personality* (New York: Oxford University Press, 1938).

The school provides a segment of the society to which the child may belong and in which his sense of belonging can be satisfied. It is, therefore, something of a tragedy for the child who is not accepted by the group, whatever the reason, and teachers are taught to look for signs of such isolation. The child who cannot gain the respect of other children or does not seem to feel the need for other children is not a healthy child in our culture.

Even though the child is part of the group and has a sense of belonging with his peers, he does not completely outgrow his dependency needs. The feeling of dependency requires some person who stands to the child as a symbol of security. In the parent, or the teacher as the parent-substitute, the child looks to someone who knows the rules of the game and who can see that justice is dealt out. Here the teacher faces the baffling situation of the necessity of giving this security to children who expect different things from him. The child from a rigid and authoritarian home may be made uneasy by the too-permissive teacher—too permissive in relation to the child's parents. The child from a very free-and-easy home atmosphere may rebel under the restraints of the same teacher—interpreted by him as too strict in the demands made upon him. Such a child may become defiant. The teacher can but try to understand and to provide an atmosphere at once permissive and supportive, adjusted as well as possible to the dependency needs of individual children.

The Need for Approval. The need for recognition—to impress others favorably—is encouraged in early life by parents who can withhold good things or administer punishment if the child's conduct is not what they wish it to be and who can reward or praise the conduct they admire. Hence it becomes important for the child to learn how to gain parental approval. Gaining the approval of playmates, teachers, and others becomes essential to gaining parental approval. Finally, approval comes to be almost an end in itself. The need for approval becomes a very strong motive for learning in school. Although from an ethical standpoint approval may be a poor thing to live for, in our culture we are strongly motivated by it.

Aggression. Every child needs to find some way to give expression to anger, hostility, and destructiveness which arise out of the thwartings which he faces. It does not mattter whether this is an original need or a derived motive, for it becomes an almost universal need. Frustration is inevitable in growing up. Need-satisfactions often have to be postponed, if not actually denied, and there are many situations in which the direct expression of resentment is not permitted. While aggression is not the only consequence of frustration, it is so common a consequence that it helps greatly in understanding aggression to look for the frustration which lies behind it.[5]

Much of the therapy in child-guidance clinics consists in permitting the child to express aggression against brothers and sisters, parents, or others who impede their need-satisfactions. The hostile activity may consist of throwing darts against an image of the offending person, abusing a doll or clay model, smearing, or in other ways giving vent to rather primitive emotions. Once the anger is expressed, it is reduced, and there often emerges a kindlier feeling to the object of the hatred. Children like their mothers and brothers and sisters better when they have had a chance to express their negative feelings without guilt. The positive feelings were, of course, there all the time. Release therapy, as this practice is called, is carried out under trained supervision and is not to be recommended as a general classroom practice. But there must be lessons to be learned from it.

One of the lessons to be learned is that we do not, as teachers, always achieve the consequences we seek by an overemphasis upon wholesomeness, propriety, and adult standards of cleanliness and order. Such an emphasis, although made with intent of kindliness and good will, often becomes restrictive and authoritarian. Occasional permissiveness, that allows a frank expression of resentment, that takes feelings at their face-value rather than forcing their denial or disguise, may result in a child's coming out more spontaneous and friendly and, in the end, actually more socially conforming.

How much aggression and destructiveness can be permitted in the classroom? The answer is, of course, that society usually does not permit the direct expression of aggression, and aggression has to be controlled. It is part of the teacher's problem to keep order, and too much freedom may be as damaging as too much control. However, some socially acceptable channels for aggressive behavior must be found, or the aggression will find some other form of expression. Among the acceptable channels may be mentioned: (*a*) violent muscular exertion, as in athletic contests, and (*b*) very fluid media of self-expression, as in finger-painting, clay-modeling, rhythms, dramatic play, and so on. Some destructiveness has to be permitted (if it means only the tearing of paper dolls), and there must be some freedom to get dirty (if only in the school garden).

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[5] John Dollard and Others, *Frustration and Aggression.* New Haven, Connecticut: Yale University Press, 1939.

Sexual Needs. We have commonly worked under the fiction that the sex life of the child does not begin until puberty, although we now know well that there is a continuity from earliest childhood to adult experience. In his study of marital happiness, Terman[6] found that several childhood factors contributed importantly to happiness in marriage. Happy parents, happy childhood, lack of conflict with the mother, a discipline which was firm but not harsh, were the factors most heavily weighted. These background factors establish attitudes toward the relationship between men and women and parents and children which are as important as specific sexual adjustments. But the study found also that parental frankness about matters of sex and a premarital attitude toward sex free from disgust and aversion were important in marital happiness. It is the ultimate happiness of the individual with which sex education is concerned.

What the school can do about sex needs is to make it easy for boys and girls to adopt their appropriate roles. Girls in our culture usually go through a healthy tomboy stage, but the girl who remains a tomboy in her late 'teens is not developing normally. The boy who is thought of as a sissy is at a distinct disadvantage socially. Learning the social roles appropriate to each sex is part of sex education. The school also has a responsibility with respect to specific sexual knowledge, making such knowledge matter-of-fact and removing it from the connotation of something obscene or dirty. To ignore sex needs is to run the danger of warping attitudes just as attitudes would be warped if any other powerful need were ignored or denied.

Ambivalence. One of the most difficult lessons to be learned about motivation is that an individual child has at once attitudes of approach and avoidance, acceptance and rejection, love and hate—toward the same object. This combination of positive and negative attitudes is known as ambivalence. The child who wishes to dominate others also wants someone to whom he can submit; we all want adventure, but without sacrificing security; occasionally it is a satisfaction to suffer pain. Children both like and hate school, they like and hate parents and teachers. It helps the teacher to know this, for then he can help children to discover what it is they like about school and what it is they dislike. Then the children will not feel guilty as they discover their own ambivalence. It is part of growing up to have the mixed attitudes which cause many children to run away from home, because home is intolerable, only to return promptly for the positive rewards it offers.

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[6] Lewis M. Terman *et al., Psychological Factors in Marital Happiness.* New York: McGraw-Hill Book Co., Inc., 1938.

Personality and Motivation

Among the needs listed by Prescott,[7] there is a set called *ego-integrative*. That is, the child needs some internal organization within his motivational system in order that he may achieve a sense of inner harmony. In this connection we think of the role of religion, or a philosophy of life, or a set of values. The enjoyment of music and the arts, satisfying work experiences, and comfortable relations with other people, all contribute to this general well-being of the person. An adequate description of the individual's ego-integrative needs and his ways of satisfying them would add up to a description of his personality.

Calling attention to ego-integrative needs shows that it is a mistake to think of motivation only in relation to the completion of isolated assignments or tasks. The whole motivational system of the learner is important: how immediate goals are set in relation to remote goals, how successes and failures are reacted to. When his systems of goals and values are understood, the individual child takes on fresh meaning to the teacher.

Because of their different personalities, children respond differently to praise and reproof, to activities done individually and those done in groups, to tasks requiring precision as against tasks requiring strength, and so on. Which athletic event proves satisfying is not merely a matter of muscular skill and endurance but reflects attitudes toward competition, toward pain, toward delight in or fear of bodily contact, and so on. Motivation cannot be divorced from the whole personality of the child.

MOTIVATION IN RELATION TO LEARNING

A distinction commonly made by those who speak to teachers about the relation between motivation and learning is that between a relation which is *intrinsic* and one which is *extrinsic*. These relations were discussed briefly in presenting the vocabulary of terms to be used. It is desirable to examine their significance somewhat more concretely.

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[7] Daniel A. Prescott, *Emotion and the Educative Process*. Washington: American Council on Education, 1938.

Let us consider the motives and incentives involved in running a 100-meter dash in an interscholastic track meet. This is a relatively simple case, because the goals are well-defined and the judges know just what they are measuring. The situation is not always as clear as this in other kinds of school learning. Among the goal-objects or incentives involved are: (1) the trophy to be awarded the single highest scorer, or the winning team, (2) the time of the race, which determines whether or not records are broken, (3) the points which are scored in each event, which are added with those from other events to determine the score for the school, (4) the letter to be awarded for making the team, and (5) the satisfaction in the muscular exertion of running. If we attempt to classify the relation of these incentives to the act of running, those numbered (1), (3), and (4) are so arbitrary as to be called extrinsic. The time of the race is intrinsically related to a good performance, for surely what a runner is trying to do is to run fast. When the success of a time score is judged against the time scores of others, however, there is a complexity added. For example, if a person runs second in a race in which the first two runners beat a record, the second runner is not credited with breaking a record. Hence there is some reference to competitive factors outside the satisfaction of running a good race. Because the reference is still to good performances in running, the relationships may be considered intrinsic, although it is evident that some arbitrariness enters in, as for example, when handicaps are allowed on the basis of prior performances. The most clearly intrinsic relation is that between running and the satisfaction of muscular exertion. A young child or a young animal, frolicking on the lawn, does not run for prizes or to make records. Even the thrill of muscular exertion in running may be derived from sources having little to do with running, such as the relief of tension arising from other unsatisfied motives, the need to demonstrate masculine virility, or what not. Hence even the relation between running and the satisfaction in exertion is a complex one.

The above illustration of the complexities in interpreting motives in what was selected as a situation with clearly defined activities and goals should suffice to show that there is no automatic solution to the problem of motivation by stating a preference for intrinsic over extrinsic relations between tasks and goals. In one sense, all relations which become effective become to some extent intrinsic. Such motives in the track meet as sportsmanship, school spirit, co-operation, and so on, may direct attention to the importance of incentives extrinsically related to the task (e.g., bringing home the trophy). Yet they take on some of the color of motives intrinsically related to a goal. Any effective incentive must communicate in some way with a motive which is real for the learner. Competition for trophies is motivating because there is a satisfaction deriving from the status of victor. The relationship between victory and satisfaction becomes essentially intrinsic, almost wholly independent of the external awards or incentives which are used to symbolize victory.

If the distinction between intrinsic and extrinsic breaks down as incentives come into relation to the motives of the learner, is there no value in what is intended by the distinction? Provided the answer is not made too easy and glib, the distinction remains useful. Two kinds of extrinsic relations between goals and tasks may be pointed out as objectionable. One is that in which an incentive derives its power primarily through the authority of the teacher, rather than through a relationship between the task and the goals of the learner. This is the motivating power of the policeman, as contrasted with the motivating power of obedience to the law because of the principles of justice, order, and other goals which it embodies. Another objectionable incentive, extrinsically related to the task at hand, is that which, like a first prize, subjects all but one of those who compete for it to failure. Against these objectionable practices, we prefer those in which learned motives have become internalized, so that in their relation to the goals of the learner they have spontaneity and naturalness (even though acquired). Then the activities undertaken are functionally related to acceptable goals, and bribes, prizes, punishment, and authoritarian practices are unnecessary. It is such a contrast which is intended in favoring intrinsic over extrinsic relations between task and goals.

Rewards, Punishments, and Their By-Products

In this section, attention will be given to the problems of the regulation of behavior by means of incentives manipulated by the teacher. Reward and punishment are here talked about in this somewhat limited sense in order to distinguish between their use and the regulation of behavior through success and failure, somewhat differently conceived.

Learning occurs when, in the presence of aroused drives, the child responds discriminatively to environmental cues and is rewarded for so doing. This, in a nutshell, is the kind of theory widely held today by psychologists who have developed the theory originally espoused by Thorndike. Something rather like what he called the *law of effect* is central to such theories, but they have incorporated a good deal of the information derived from conditioned-response experiments. Instead of reward, these contemporary theorists commonly speak of reinforcement, using Pavlov's word for the equivalent of reward.[8] According to those holding such views, primary rewards or reinforcements are those leading to tension-reduction through satisfying drive conditions, as when hunger-tension is reduced by feeding, or thirst-tension by drinking. Secondary or acquired rewards are those which derive their strength through prior association with primary rewards. Thus, money derives its rewarding power through association with the good things which money has bought in the past. Those who hold firmly to the theory believe that there is no learning except as aroused drives are somewhat satisfied by rewards. Punishment is variously treated, but there is a tendency to subsume the action of punishment under that of reward. This is possible because escape from punishment is rewarding. Thus, escape from pain is as rewarding as escape from hunger-pangs. Whatever learning takes place through punishment depends upon an arrangement which makes escape from the punishment (or avoiding it) rewarding. This does not imply that discipline through punishment is desirable, but it states the theoretical situation under which punishment may influence learning, as indeed it may.

Reward in School Learning. Rewards or incentives, when they are used to regulate school learning, are almost exclusively secondary or derived rewards. That is, the goal-objects are those which would not have reward value in themselves except for what they stand for. Gold stars, school marks, and rank orders derive their reward value from such learned motives as the desire for prestige, recognition, and so on. The characteristics of the goal object are relatively unimportant. What the reward signifies is much more important.

An oft-quoted experiment by Hurlock[9] on the relative effectiveness of praise, reproof, and ignoring showed that school arithmetic improved most under praise, next under reproof, and least when the child was one of the ignored group. The praise and reproof were administered to the children as a group, so that there was no informative value as to specific errors or correct responses. It is evident that social motives were aroused and that the condemnation or praise did not act in simple fashion by strengthening or weakening connections.

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[8] This is not the place to go into details about psychological theory, but the view just mentioned is associated with the names of Clark L. Hull, Neal E. Miller, John Dollard, O. H. Mowrer, K. W. Spence, and, in a slightly different version, B. F. Skinner. An introduction to their views may be found in Ernest R. Hilgard, *Theories of Learning* (New York: D. Appleton-Century-Crofts, Inc., 1948).

[9] Elizabeth B. Hurlock, "An Evaluation of Certain Incentives Used in School Work," *Journal of Educational Psychology*, XVI (1925), 145-59.

That rewards influence learning is beyond doubt. The question becomes how they can be used appropriately. One of the problems which exists for the teacher is that of the by-products of reward, when reward is viewed as part of a total social situation. A teacher-planned reward extrinsically related to the learning task is a kind of bribe and may lead to the attitude, "What do I get out of this?" That is, an activity is only worth while for the remuneration it brings in praise, attention, or financial gain. Then there is the question of what happens to those who fail to get the reward. If there is only one prize and many contestants, the problems of the losers are to be faced along with those of the winners. Perhaps the winner will be encouraged through the effectiveness of his reward, but what of the others? Is the price in disappointment to them worth what the gain was for the winner? Rewards are almost always competitive: If everyone receives the same recognition or gets the same mark, then the reward value goes out. Even in the stress on group achievement, the group may be set in competition with another group, in order to maintain the reward value of special status.

Lewin[10] has pointed out the nature of policing involved in a reward situation. The teacher (or other authority) must provide a barrier against the attainment of the reward by any short cut not requiring the completion of the specified task. Examinations require proctors because there is a tendency to reach the goal by shorter routes. The kind of reward which has to be artificially guarded is the kind which is objectionably extrinsic, for its reward value is related to the task only through the arbitrary arrangements set up by those in authority.

Because rewards are regulated by authority, too much emphasis upon rewards encourages docility and deference to authority rather than originality and spontaneous endeavor. School children soon learn that they receive attention and praise through doing primarily what the teacher expects. Even in college we find students who have an annoying habit of asking the professor to state exactly what they are expected to read and to remember, when he would prefer to have them tell him what they want to know. This is what they have learned through the system of rewards under which they have grown up.

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[10] Kurt Lewin, "Field Theory and Learning," *The Psychology of Learning*, pp. 215-42. Forty-first Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1942.

Punishment in School Learning. Even though reward cannot be given a clean bill of health, it is much to be preferred over punishment. This is the upshot both of experimental investigations and of the testimony of school people through many years.[11]

The major objections to punishment as a motive for learning are the following:

1. While punishment may alter behavior, the results of punishment are less predictable than the results of reward. Reward says: Repeat what you have done. Punishment says: Stop it! But the punishment does not tell what to do, and the result may be simply emotional upset.
2. The interpersonal aspects of the punishment situation are fraught with more hazards than those in reward. As a teacher or parent becomes emotionally upset, it is an easy matter to take out aggression on children through punishment. The children may be provocative, but the danger of injustice in punishment is great, and children are extremely sensitive to injustice. The meaning to the child of being punished by a powerful adult is complex, and regardless of the effect on immediate behavior there may arise concealed attitudes of resentment, of dislike of the work for which punishment was imposed as well as of the punishing teacher.
3. The results of punishment are said to be less permanent, so far as learning is concerned, than the results of reward. The evidence to date comes largely from animal experiments,[12] but the possibility is a good one that the effects of punishment are primarily emotional, affecting performance rather than learning. Thorndike takes the position, in his modification of the law of effect, that punishment, unlike reward, has little or no direct effect upon the strength of connections.
4. Punishment under some circumstances tends to fix the punished behavior rather than to eliminate it.

The evidence for this statement also comes most clearly from animal experiments.[13] An animal punished in a choice situation which is too difficult for it tends to develop a stereotyped response. Once the stereotyped behavior has become fixed, it may persist for hundreds of trials, *even though the response is punished every time* and a simple alternative to it exists.

Comparable experiments with human subjects have not been done in such clear-cut fashion, but there is some clinical evidence that forms of discordant behavior, such as thumb-sucking and stuttering, are aggravated rather than cured by punishment. The animal experiments suggest what may be happening. When a child is doing something in which errors are being made because the situation is either unclear or too hard, punishment may lead to repetition of the undesirable behavior because it is easier to do what has been done and to take the familiar punishment than to face the uncertainty of change and additional frustration. The child becomes in some sense incapable of trying. This appears to be true in some stubborn cases of difficulties in reading, arithmetic, and spelling. Critical experiments in these fields would be helpful, but it seems entirely plausible that parallels to the animal experiments would emerge.

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[11] Edward L. Thorndike, *The Psychology of Wants, Interests, and Attitudes.* New York: D. Appleton–Century Co., 1935.

[12] E.g., W. K. Estes, "An Experimental Study of Punishment," *Psychological Monographs,* LVII, No. 263 (1944).

[13] The relevant experiments are reviewed in Hilgard, *op. cit.,* pp. 302-8.

In many of Thorndike's experiments the use of the word "wrong" was interpreted as teacher disapproval and, hence, as punishment. A distinction should be made between information by which to regulate conduct (whether it be knowledge of errors or of successes) and the added positive and negative incentives of bonuses for good results and penalties for bad results. Guidance through information is desirable according to any theory. What we are talking about here is the added influence of promised rewards or threatened punishments. It is because punishment is painful, mortifying, anxiety-producing, that its use is hard to regulate.

These four objections to the use of punishment do not mean that punishment is never useful in learning. They mean only that it is difficult to use punishment effectively. Two main cases may be mentioned in which punishment is useful.

The first is when punishment is appropriately combined with reward. Punishment may occasionally be used to redirect behavior so that the desired behavior can occur and be rewarded. Even though the effect of punishment is temporarily disturbing, it may under some circumstances permit the more permanent effects of reward to become operative. For example, receiving a shock through mishandling an electrical appliance in science may be effective if supplemented by help in correcting the hazardous condition.

The second situation in which punishment is appropriate is that recognized clinically as one in which the need for punishment is great. A child sometimes tests the authoritative adult by provocative behavior, to see how far he can go. If not punished (in order that the limits may be defined for him), his anxiety mounts as he does things which seem to him beyond the law. Prompt enforcement of the law may reduce his anxienty by clarifying the limits as to what is allowed. The alternative to punishing at this point is to understand what the child is trying to do. His behavior may represent rivalry with a classmate, or it may be a special bid for attention from the teacher. If the motives are understood, the tension may be reduced without punishment. The situation in which the need for punishment is great is an unusual one, and the teacher is unlikely to be able to detect these situations with sufficient confidence to justify a paddle in the cloakroom.

Success and Failure as Regulators of Learning

To view learning according to success and failure does not contradict the possibility of control through rewards and punishments, but it puts the emphasis where it ought to be—on what the learner is trying to do. Success can be defined psychologically only in accordance with the learner's goals. What is success to one may be failure to another. One of the greatest troubles to the teacher is the child who appears to be satisfied with a poor or mediocre performance. "Good enough" for him is not "good enough" for the teacher. True success may be defined as reaching a goal, although there are partial-success experiences along the way, as in the sense of progress toward the goal or getting into the goal region. The teacher can help maintain the success experience by capitalizing upon the subgoals along the way and by avoiding so narrow a definition of goals that they are attainable by only a few. Thus the goal of improvement is open to all, while the goal of being at the head of the class is restricted to a single child. Vocational goals can be acceptable, whatever the occupational level, and it would be a mistake to lay too much emphasis upon white-collar and professional work as desirable goals. It is important to see that goals be set so that all children have a share in the success experience of goal-achievement.

The study of the after-effects of school success and failure in arithmetic and reading by Sears [14] points to the way in which previous experiences affect goal-setting. In general, Sears found that those with a prior experience of success in the subject-matter under consideration tended to be realistic in their goal-setting. That is, they expected improvement of themselves but did not expect scores much out of line with what they were now doing. Those with prior experience of failure did not set their goals in this way. They tended to deviate in either of two directions. Either they were so beaten down by failure that they expected nothing of themselves or they ignored their failures by expecting totally unrealizable gains. In the one case they set very low goals, as though to report, "I know I'm no good at this;" in the other case, by setting their goals high, they seemed to say, "If anybody can do it, I can." Neither of these positions is a wholesome one. It may be remarked, parenthetically, that emphasis upon trying, being co-operative even at tasks which are too difficult, is often praised in our schools, thus encouraging the unrealistic type of goal-setting.

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[14] Pauline Snedden Sears, "Levels of Aspiration in Academically Successful and Unsuccessful School Children," *Journal of Abnormal and Social Psychology*, XXXV (1940), 498-536.

When teachers are encouraged to emphasize success experiences, the argument has to be faced that the child must learn to accept failure because he has to live in a competitive society. One answer to this argument is that society is often kinder than the schools by not insisting on the repetition of activities for which the individual is not qualified. When a man fails in a job, he takes the consequences but usually goes after a different kind of job. When a pupil fails a school year, he is sometimes sent back to the same class to face failure all over again. Some experience of failure to reach goals is inevitable; in fact, such experiences are so prominent that there is little point in the school's seeking to create any more of them. A better preparation for failure is to have a sufficient backlog of success experiences so that failure is not devastating.

It is possible to teach toleration of failure, as shown in the study by Keister.[15] But it is important to note that the way in which young children were taught to accept failure was to link temporary failures with ultimate success. They were not taught to endure lasting failure: They were taught not to be impatient but to keep striving until success was achieved. In other words, the regulator of conduct depended upon was success, not failure.

Another consequence of the experiences of success and failure is the change which comes in the attractiveness of tasks. It has been shown experimentally that success (and anticipated success) increases the attractiveness of otherwise neutral activities, while the converse is also true. Failure (or anticipated failure) may make an otherwise acceptable task become a distasteful one.[16] The bearing of these studies upon motivation in school is obvious.

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[15] M. E. Keister, "The Behavior of Young Children in Failure," *University of Iowa Studies in Child Welfare,* XIV (1937), 28-82.

[16] Dorwin Cartwright, "The Effect of Interruption, Completion, and Failure upon the Attractiveness of Activities," *Journal of Experimental Psychology,* XXXII (1942), 1-16; Mildred E. Gebhard, "The Effect of Success and Failure upon the Attractiveness of Activities as a Function of Experience, Expectation, and Need," *Journal of Experimental Psychology,* XXXVIII (1948), 371-88.

Progressive Goal-setting

Goal-setting comprises both momentary and long-time goals. The momentary goal is related to the specific task at hand, whether it be completing a jigsaw puzzle, painting a model boat, adding a column of figures, or winning an election. It is characteristic of young children that most of their goals are near at hand, and, though they may talk glibly of the remote future, their successes and failures lie in the present. That is why they are so impatient of frustration. As the child grows older there is an interlocking and overlapping of immediate and remote goals into a kind of goal-system, which then supports sustained effort against momentary setbacks. Time perspective[17] for many children (and adults) is always foreshortened, so that immediate successes or defeats are exaggerated. At adolescence, the intensity of disappointments and the thrill of conquests are enhanced because immediate victories and defeats are seen at close range.

What all this means to the teacher is that it is necessary, first, to consider the pre-eminence of immediate goal-seeking with its attendant satisfactions and frustrations. The child is concerned with finishing his model semaphore in the unit on trains, and the adolescent with solving the next problem in algebra—neither being particularly concerned with his occupation at age thirty. But the teacher must be concerned, second, with the influence of the immediate experiences upon the child's or adolescent's ability to deal with more remote goals.

This is a problem of seeing things in relationship, of seeing tasks—which are complete in themselves—as incomplete in relation to something larger. There is a nice balance between having the satisfaction of finished work without having immediate goals replace more remote ones. The boy who builds a simple model sailboat has the satisfaction of completing it, yet he is aware of new fields to conquer—larger boats, with more complex rigging. An immediate goal can be a waystation toward more remote goals. Thus, a boy preparing to become an engineer may derive double satisfaction from his mathematics—first, the satisfaction in problem-solving which comes when mathematics is well taught, and, second, the satisfaction from the mastery of a tool which moves him forward toward his vocational goal.

Goal-setting is itself something the child must learn. If he is taught planfulness in small matters, he is able to plan later on for matters of greater consequence. To plan to earn and to save his money to buy a bicycle is not unlike forming a plan later on to buy a house. Transfer of training does not come automatically in goal-setting any more than it does in other skills. It is necessary to provide opportunities for setting goals in approved ways and for achieving goals by techniques which are socially acceptable. Only through capitalizing on such opportunities will the pupil acquire the kind of self-determination which we admire among mature men and women. It is a mark of character to strive toward desirable ends which are deferred.

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[17] Lawrence K. Frank, "Time Perspectives," *Journal of Social Philosophy*, IV (1939), 293-312.

MOTIVATION IN RELATION TO SPECIFIC SCHOOL PRACTICES

Administrative Practices

Motivation for learning is not something magically produced by the teacher at the beginning of a lesson in reading or social studies but a process involving a complex of conditions within the individual and the total school environment. The teacher's personality, the classroom surroundings, the equipment, the other children, and the administrative policies of the school all determine the effectiveness of learning as well as the types of learning in any larger view of the educational program.

One of the most important administrative policies related to children's learning is a school's promotion policy. For many years elementary and secondary schools advanced pupils to a higher grade solely on the basis of subject-matter achievement. Failures of 20 to 25 per cent of first-grade children who had not learned to read were common and there was a piling-up of pupils in certain grades, such as the third grade and eighth grade, in some school systems. As Otto[18] has pointed out, these schools admitted children to kindergarten or first grade on the basis of chronological age and at the end of one or two years shifted completely their basis for admission to the other grades. More recently, the emphasis upon other factors such as social development and children's interests has brought about a change in promotion policies, and many school systems today have more or less automatic promotion from grade to grade on the basis of chronological age or a composite of several related developmental factors. Some teachers and administrators still feel that children should be retained in a grade until they have attained certain minimum standards of achievement, but their position receives little or no support from research findings.

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[18] Henry J. Otto, "Implications for Administration and Teaching Growing Out of Pupil Failures in First Grade," *Elementary School Journal*, XXXIII (September, 1932), 25-32.

Carefully collected evidence suggests that children's learning is less efficient if they are kept back with younger children than if they proceed through school with their own age group. A large number of studies have been summarized by Caswell[19] and by Saunders[20] to indicate that the general motivational pattern of proceeding with one's own group seems better than that of repeating work with easier materials and younger children. In general, subject-matter achievements of children who proceed through school regularly are higher than those of similar children who are retarded.

Since this yearbook is concerned with the learning of attitudes and habits associated with personality as well as with more academic learnings, it should be pointed out that research evidence also favors regular promotion from the point of view of children's personal-social adjustments. Sandin[21] has shown that elementary-school children who have not been promoted one or more times are rated by both teachers and pupils as having more undesirable personality and behavior traits than regularly promoted children. Whether the undesirable traits caused the failures or the nonpromotion accentuated the difficulties, few beneficial effects of nonpromotion could be found. The methods of coping with the more antisocial behavior of the retarded group were of doubtful motivational value, since Sandin found that teachers most frequently called attention to these children's shortcomings, gave them private lectures, and retained them after school hours.

Although the evidence is overwhelmingly against a school policy of retardation of considerable numbers of children, more or less automatic promotion does not provide, of itself, the best motivational situation for effective learning. Contributions to a good learning situation such as success and approval, mentioned above, may be denied a child in school having regular promotions unless certain other administrative practices help create a good situation. Hildreth,[22] for example, lists as necessary accompaniments of "straight promotion" such practices as individualized teaching of basic skills, grouping within a grade, providing a wider range of books and other materials, a functional school library, and avoidance of a narrow remedial type of teaching. In other words, the wise school administrator will bulwark a system of more or less automatic promotion with certain other practices containing motivational features desirable for efficient instruction and learning.

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[19] Hollis L. Caswell, "Policies and Practices in Regulating Pupil Progress," *Education in the Elementary School,* pp. 248-300. New York: American Book Co., 1942.

[20] Carleton M. Saunders, *Promotion or Failure for the Elementary-School Pupil?* New York: Bureau of Publications, Teachers College, Columbia University, 1941.

[21] Adolph A. Sandin, *Social and Emotional Adjustments of Regularly Promoted and Nonpromoted Pupils.* Child Development Monographs No. 32. New York: Bureau of Publications, Teachers College, Columbia University, 1944.

[22] Gertrude Hildreth, "Hazards of 'Straight Promotion,'" *Educational Administration and Supervision,* XXXII (January, 1946), 19-26.

A second administrative factor in the total learning situation is the type of school organization. Interest in special types of organization such as the Batavia plan or the Gary plan has been largely replaced by an emphasis upon the *interna* of the curriculum in most modern school systems. However, the question of where to begin departmentalization of instruction is one still unsolved by research and practice. The above discussion of personal-social needs suggests that many children, especially young children, are probably best placed in school situations where security, affiliation, and approval are achieved without too much difficulty. As the subject matter taught in school becomes more specialized, the advantages of having an expert as instructor should increase if he can show values and relationships in the material which serve as some sort of intrinsic motivation. Departmental teaching makes it difficult to keep the program adequately flexible and integrated. The regular classroom teachers can do a great deal even with experiences such as art and music which are commonly departmentalized. In a summary of research on departmentalization in the elementary school, Seegers [23] suggests that departmentalization may lend itself to efficient teaching of isolated skills but that it is not a particularly good organization for teaching and learning in general. Attempts at special grouping for the teaching of reading, for example, seem to have about as many disadvantages as advantages.[24] At the secondary-school level a variety of attempts have been made to break down a strictly departmentalized approach to instruction. The homeroom, the double period, and the core program represent attempts to place instruction on a sounder motivational basis by relating it more directly to adolescents' needs.

School surveys indicate that some sort of departmentalization commonly begins at the junior high school level, and accumulated experience seems to suggest that, at this and other levels, many other factors in addition to the system of departmentalization influence learning. Departmental schools may not differ from nondepartmental schools in actual practice as much as they do in theory.[25] Special instructors in music and art at the fourth-grade level, or the core program at the tenth-grade level, may or may not provide a series of highly motivated experiences for the children concerned. In general, since most departmentalization of instruction is related to artificial divisions of subject matter rather than personal-social factors motivating conduct, it does not of itself provide a well-motivated series of learning activities, and, if in use, it must incorporate other features to provide optimum opportunities for learning. There is nothing to preclude more specialized subject matters (*e.g.*, science or history) from furnishing their own motivation, providing they are kept in context, and the student has some sense of initiating his own inquiries.

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[23] J. Conrad Seegers, "More about Departmentalization," *Elementary School Journal*, XLVII (March, 1947), 396-401.

[24] David H. Russell, "Interclass Grouping for Reading Instruction in the Intermediate Grades," *Journal of Educational Research*, XXXIX (February, 1946), 462-70.

A third administrative policy which merges into classroom and curriculum practices is the provision of co-curriculum activities in the total school program. The values of various co-curriculum activities such as athletics, dramatics, hobby clubs, community projects, and student councils have been treated extensively, especially at the secondary-school level.[26] In a recent survey of 532 elementary schools, Otto[27] found that co-curriculum activities were not very extensive. The largest variety of activities engaged in within the classroom was found in medium-sized schools, with one- and two-teacher schools having as many co-curriculum activities as schools of more than twenty-five teachers. The tendency of the modern school, especially at the elementary level, to include a wider variety of learning situations within the regular curriculum may reduce the actual number of activities listed as co-curriculum or extra-curriculum. Although the values of such activities have not all been established by formal research, the motivating influences of activities which can be chosen on a somewhat individual basis, and which seem often to have a closer relationship to social-personal needs than does organized subject matter, are known to every teacher. Educational reports and folklore are full of stories of how some child developed special interest and competence in a co-curriculum activity and how his whole attitude to other school learnings was changed accordingly. The adroit teacher today incorporates many activities formerly considered extra-curriculum into the regular program of classroom activities; but whether they exist within or outside the usual class activities, such activities would seem to be essential to a properly motivating school program.

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[25] Margaret Rouse, "Comparison of Curriculum Practices in Departmental and Nondepartmental Schools," *Elementary School Journal,* XLVII (September, 1946), 34-42.

[26] See, for example, Harry C. McKown, *Extra-curricular Activities.* New York: Macmillan Co., 1937 (revised).

[27] Henry J. Otto, "The Composition of Elementary-School Programs," *Educational Administration and Supervision,* XXXIII (January, 1947), 1-12.

A fourth administrative policy affecting learning is the marking system or method of assigning grades. The topic has been treated partly in the second section of this chapter. In general, marks have been classed as extrinsically related to subjects learned, but, as indicated above, the classification may break down somewhat upon analysis. Marks as symbols of desirable achievement may be close to intrinsic satisfaction in success in the activities themselves, and a fairly good argument for them can be given in light of such current school conditions as large classes, limited counseling services and requirements of higher institutions. As suggested above, however, most marking systems are undesirable forms of motivation in that they stem from the authority of the teacher or principal rather than from the relationship between skill, attitude, or information acquired and the motivational system of the pupil. They are often dangerous also in that they limit outstanding success to the few and, if based on actual achievement, condemn a large group of children to continual frustration and defeat in school. Sometimes low marks or grades may have the value of acting as a springboard to the study of a child's needs and to some sort of remedial treatment on an individual or small-group basis. However, the process of teacher diagnosis or teacher-child diagnosis is likely to be a sounder basis for a change in the learning environment than a blanket grade of "D" or of 60 per cent. Research quoted above suggests that children who get such marks are neither stimulated to work more efficiently nor able to estimate their probable achievement in similar tasks. Most marking systems may have some justification in administrative necessity and they may stimulate the few children, who have a chance, to superior competitive effort, but they cannot be justified on the basis of stimulating better learning in a whole class or a school system.

Many other administrative practices affect motivational factors influencing learning in the school. Grouping of pupils, teacher status, school-community relations, even the system of co-education almost universally accepted in the United States, all influence the sort of learning which occurs in a classroom and on playground or street. The moral would seem to be that school people should plan these and similar procedures, not as administrative conveniences but as possible sources for the stimulation and enrichment of learning experiences in the school. The child-development approach to the curriculum and subsequent chapters of this yearbook offer a number of examples of how these and other administrative policies can be used in fostering valuable patterns of motivation within the total learning situation.

Classroom Practices

The list of motivational factors in the classroom is longer than the list of teaching methods and devices used by the teacher, for it includes not only these methods but also certain phases of the children's personalities and interpersonal relations in the group. For purposes of convenience, classroom practices are considered here as administrative practices, such as subgrouping, instructional practices (e.g., methods in problem-solving), and evaluative practices such as using cumulative records. These are obviously overlapping categories since, for example, instruction varied with different groups and self- or class-evaluation may be one instructional device used by the teacher.

Administrative Practices. Such practices as subgrouping, individualization of instruction, management of routine, and methods of discipline may be classed as administrative devices in the classroom. Grouping for instruction in reading is now common in elementary schools, with grouping for instruction in arithmetic, spelling, and other skills somewhat less common. Early methods of grouping were based on mastery of subject matter. More recently, knowledge of individual differences and more extensive use of standardized tests have influenced grouping procedures. Newer theories of grouping, growing out of psychological and sociometric studies, emphasize the importance of interpersonal relations and group activities in child development and learning. In relation to motivation, two advantages of subgrouping within a class may occur in terms of the learning task and the interpersonal relations of the small-group situation. The existence of subgroups makes it possible for the teacher to adapt methods and materials more closely to the level at which a child will be highly motivated to learn. The experimental work on levels of aspiration, such as the Sears study mentioned above, indicates that the teacher should not ask a child to go above or below the difficulty level of certain learning tasks. Holt[28] suggests, too, that a student's level of aspiration, when self-esteem is threatened, is a form of defensive behavior rather than an incentive to learning. However it may operate in the motivational system, the value of learning tasks adapted to the interest and ability of the subgroup is unquestioned. The second value of the small group may lie in the interpersonal relations of the group. Most primary children are incapable of participating with social groups as large as the typical class, although, of course, the whole class may participate in some group activities. At all levels, the small group may have friendships and other status-giving relationships which result in desirable motivation and appropriate changes in attitudes and behavior. Individualization of instruction reduces the group to one; it gives greater opportunity to capitalize on one child's interests and needs but reduces the chance of group influences being exerted on learning. If a child has become disorganized through much failure, the face-to-face work with the teacher and the work on individual projects may be more important than group influences. Eventually, however, the child treated individually should have opportunities to acquire some of the skills of democratic living in the group.

Management of routine and other factors in the "discipline" of a classroom often influence motivational factors strongly. The modern concept of discipline seems to be changing from the idea of straight rows and pin-drop silence to that of the root meaning of the word. Just as the related word *disciple* means a learner, so *discipline* refers to a good learning situation. Occasionally a good learning situation in the school can be noisy and apparently disorganized, particularly if it is followed by quieter, more organized activities. The capable teacher plans her day so that the type of activity varies from noisy to quiet, from active to less active, throughout the day. The use of rewards and punishments in connection with learning, as discussed above, applies equally to such learnings as conduct in the classroom or on the playground. The continuous use of a certain form of punishment, for example, not only affects the learning of the behavior involved but also the possibilities of other behavior of both teacher and pupil. The teacher who frequently keeps a child after school in an effort to improve his behavior affects not only the child's responses but also his own potentialities in similar situations where he must deal with problem behavior.

As in the case of families, excessively harsh and lax discipline in the school seem to be equally bad in energizing and directing behavior. The well-known studies of Lewin, Lippitt, and associates indicate that the laissez-faire classroom situation produces as undesirable behavior as the extreme authoritarian situation. A study[29] of the reactions of Indiana high-school pupils to methods of discipline used by their teachers suggests that students are generally inclined to support school regulations. They are somewhat more liberal than teachers regarding many regulations but more rigid in regard to penalties for stealing, lying, and damaging school property. The girls included in this study have more respect for regulations than do the boys, but all attitudes vary considerably from community to community. There is other evidence to suggest that the same methods of controlling or guiding classroom activities are not equally successful with all the children of a group who come from homes with widely varying methods of child management. Accordingly, modern writers on the subject usually stress an individualized, guidance approach to behavior problems in the classroom and a mental-hygiene approach to class management.[30]

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[28] R. R. Holt, "Level of Aspiration: Ambition or Defense," *Journal of Experimental Psychology*, XXXVI (October, 1946), 398-416.

The topic is discussed further in a succeeding section on interpersonal relationships in the school. Since discipline is a part of the total classroom situation and since it refers to the efficacy of the learning situation it must be considered a large part of the motivational pattern for any school learning.

Instructional Practices. This chapter indicates that to the degree to which motivation exists in the environmental situation, the whole school program is involved. The part of the program most directly aimed toward providing desirable motivation for learning is, however, the instruction given in the school. Teachers show introductory pictures, initiate discussion of the topic, help plan construction, rhythms, and dramatics, read to pupils, have guest speakers, give special assignments, show films, have displays of pupils' work, all to stimulate interest in materials they think children should learn. This may be a narrow view of the process, but many teachers will verbalize that they are thus "motivating" their pupils. As suggested above, motivation can never be considered as existing in isolated fragments of class activities; but a few specific practices can be mentioned here.

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[29] Charles E. Corbin, "The Attitude of High-School Pupils toward Various Methods of Discipline" (Studies in Higher Education, No. 31), *Bulletin of Purdue University,* XXXVII (December, 1936), 214-24.

[30] See, for example, Norma E. Cutts and N. E. Moseley, *Practical School Discipline and Mental Hygiene* (New York: Houghton Mifflin Co., 1941); Paul Witty (chairman), *Mental Health in the Classroom* (Thirteenth Yearbook of the Department of Supervisors and Directors of Instruction. Washington: National Education Association, 1940); and George Sheviakov and Fritz Redl, *Discipline for Today's Children and Youth* (Washington: Department of Supervision and Curriculum Development, National Education Association, 1944).

Considerable work on learning suggests the importance of goal-seeking and knowledge of goals. Too often children and adolescents are unaware of the purpose, immediate or distant, for which they are performing school tasks. The value of children knowing the reasons for their activity seems obvious. If they know why they are reading a selection, their reading of it will be more efficient. If they know what the arithmetic problem or social-studies problem asks, they can proceed to its solution more economically. The importance for motivation of the planning period and the assignment is, therefore, considerable. In a typical modern classroom, teacher and children take time daily to plan their activities, and out of such planning may grow the more formal assignment of work.

The influence of the nature of the assignment on what is learned has been shown in many investigations. One study[31] at the college level not only suggests that learning is influenced by explicit set in methods of reading but that so-called incidental learning is not haphazard and is aroused concurrently by sets related to the primary purpose. Students may learn adjacent items or be inhibited on items too similar to each other.

A study[32] of children's opinions about desirable types of assignments gives some support for modern practice. On the basis of questionnaire responses, the children of Grades IV, V, and VI seemed to prefer assignments in multiple textbooks; group practice was about even but slightly above working with a partner; and self-direction in finding materials was desirable. (In this connection, cf. chap. ix.)

The importance of planning, assigning, or setting standards of work at reasonable levels has been underlined by the level-of-aspiration studies mentioned above. The opinion that children are stimulated to do better work by making the task difficult received no support in a study of preschool and primary children[33] and the frustration that results from increasing the difficulty of the task without compensating help has been clearly demonstrated.[34] The job of the teacher is apparently that of keeping a nice balance between an ease of tasks that conveys no challenge and a difficulty of tasks that frustrates most of the group.

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[31] Leo Postman and Virginia L. Senders, "Incidental Learning and Generality of Set," *Journal of Experimental Psychology*, XXXVI (April, 1946), 153-65.

[32] Dorothy H. Stewart, "Children's Preferences in Types of Assignments," *Elementary School Journal*, XLVII (October, 1946), 93-97.

[33] Irwin L. Child and E. Adelsheim, "Motivational Value of Barriers for Young Children," *Journal of Genetic Psychology*, LXV (September, 1944), 97-111.

Instructional methods usually include the use of praise and blame, rewards and punishments, and individual and group competition. As suggested, the effectiveness of each of these as an incentive is dependent in a large measure on the teacher and the total classroom situation. Learning in groups seems to be superior to learning accomplished in isolation, but competition in small groups is ordinarily more effective than in large groups. A study by Thompson and Hunnicutt [35] further suggests that the effects of praise or blame may depend upon the personality of the pupil. They found that, if repeated often, praise increases the work output of fifth-grade pupils classed as introverts until it is significantly higher than that of introverts who were blamed repeatedly. Also, blame increases the work output of pupils classed as extroverts over that of extroverts who were praised or introverts who were blamed. The easy maxim but difficult procedure of adapting to individuals seems to face the teacher once more in her use of incentives to learning.

Important as they are, incentives to learning seem to lack the motivational force of the actual materials and methods of instruction. The skilful teacher somehow is able to find and use materials of instruction that are challenging and even exciting to the student. At the same time the good teacher seems able to present the materials and to guide the students' exploration of them in such a way that the classroom is a pleasant, relaxed situation with everyone finding some satisfaction in achievement and in planning for further related work. Some teachers achieve this happy situation through wise use of pupil-teacher planning. Others achieve it through emphasis upon concrete materials rather than mere verbalism. Some achieve it by realistic problem-solving and opportunities for children's "research." Some teachers attain this level of effort by the timeliness of the topics discussed and studied. The instructional setting can provide the motivational setting for effective learning. What this amounts to is that the curriculum should deal with such common and basic values that motivation is assured.

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[34] Alvin F. Zander, "A Study of Experimental Frustration," *Psychological Monographs*, LVI, No. 3. Evanston, Illinois: American Psychological Association, 1944.

[35] G. G. Thompson and C. W. Hunnicutt, "Effect of Repeated Praise or Blame on the Work Achievement of Introverts and Extroverts," *Journal of Educational Psychology*, XXXV (May, 1944), 257-66.

Evaluative Practices. The motivational effects of evaluation programs have long been evident in the schools. If achievement is rated by tests, both teachers and pupils work to pass the tests. If progress is appraised in other ways, activities related to these methods of evaluation are evident in the daily or weekly school program. The modern point of view is that evaluation is not a series of periodic examinations applied externally but an intrinsic part of the learning process with its planning, evaluating cycle. Tests do, of course, have their places in this process. Viewed thus, methods of evaluation can be one of the most valuable tools for creating interest and purpose in further learning.

The process of continuous evaluation in the classroom is closely related to the idea of progressive goal-setting described above. The child who is building a covered wagon in a unit on the westward movement is encouraged by teacher and fellow-pupils in specific ways to improve his construction. The third-grade pupil who has told a story to the class is asked to rate his own performance in light of the four standards for story-telling given on the available classroom chart. The high-school pupil who has reported on the causes of the French Revolution is encouraged by the teacher's and students' discussion to dig more deeply into causal relationships. In a sense, the learning process itself becomes the motivation for more learning, and goals are placed on increasingly mature levels.

In this process self-evaluation is central. Writers on the subject have long stressed the importance of self-evaluation, but little experimental evidence is available to guide practice. Tschechtelin,[36] Stier,[37] and others have shown that children's opinions of their achievement are not closely related, in general, to teachers' opinions, especially for boys and for older children. Furthermore, the ability of elementary-school children to predict their school grades does not improve without specific help. Obviously the difficulty may lie either in the inexperience of the children or in the lack of relationship between school grades and actual learning. On the other hand, the values of talking over achievements and difficulties with the teacher or in small groups have been extolled by various writers. To the extent that self-evaluation leads to self-knowledge and realistic goal-setting, it can be an important part of the motivational setting of the school.

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[36] S. M. Amatora Tschechtelin, "Self-appraisal of Children," *Journal of Educational Research,* XXXIX (September, 1945), 25-32.

[37] Lealand D. Stier, "A Comparison of Self-Evaluation, Peer Evaluation, Teacher Evaluation, and Standardized Tests on Personality and Achievement Factors in the Fifth and Eighth Grades." Unpublished Doctor's dissertation, University of California, 1948.

Interpersonal Relationships in School

The emphasis upon personal-social needs in the first section of this chapter introduces the idea that interpersonal relationships are usually more fundamental in motivational patterns than are specific teaching devices. The older conception of teaching and of learning as a sort of filling-station process with knowledge passing from a larger to a smaller tank has been replaced by ideas emphasizing the dynamics of interpersonal and group action during learning. The child is motivated to learn because he is the sort of person he is, surrounded by the sort of teacher and peers he has in his immediate environment. The teacher may think he is teaching the properties of oxygen, but the student may be learning to respect scientific knowledge or dislike science teachers; the teacher may think he is teaching the addition of fractions, but the child may be learning the gang's boredom with school or the value of group effort in solving problems. All learning is energized and directed by the social-personal relationships of the school. From day to day the child is affected by child-child relationships, teacher-child relationships, parent-teacher-child relationships, and counselor-student relationships which exist in his school.

The importance of interpersonal relationships in the school has been emphasized in a number of mental-hygiene publications.[38] A summary of recent research in mental hygiene[39] treats such topics as the effect of the teacher's personality on mental health of students and the ability of teachers to understand and evaluate the importance of pupils' behavior. The use of sociometric techniques, the "Who's-who-in-my-group" procedure, and similar devices has enabled some teachers to arrive at social factors affecting a child's conduct and learning and to rearrange situations so that superior motivation existed.

Another approach to the study of interpersonal relations concerns investigations of teacher-pupil relationships. The influence of the teachers upon pupil behavior has been clearly demonstrated in studies by Lewin and associates, mentioned above, and in the work of Anderson,[40] Baxter,[41] and others. Anderson finds, for example, that dominative behavior, such as imposing goals, giving orders, threatening and blaming, leads to resistance and to overconformity. The teacher's "socially integrative" behavior, such as getting the child's acceptance of goal, giving approval, and admitting one's own error, promotes spontaneity and initiative in learning. In other words, the teacher's methods of working with the children not only affect the efficiency with which they learn but also the kinds of learning that occur.

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[38] See, for example, D. B. Klein, "The Psychology of Personality Adjustment," *Mental Hygiene*, pp. 431-73. New York: Henry Holt & Co., 1944.

[39] William A. Snyder, "Recent Investigations of Mental Hygiene in the Schools," *Educational Research Bulletin*, XXIV (October, November, December, 1945), 178-85, 222-24, 231-48.

Increased emphasis upon the guidance program in schools has encouraged the growth of teacher-parent conferences and counselor-student conferences in both quantity and quality. The mutual understanding and increased knowledge of a child's or youth's problems which arise out of such interviews, properly planned and conducted, must be regarded as one more part of any adequate picture of motivational factors influencing the pupil.

SUMMARY: THE TEACHER'S ROLE IN PROVIDING FAVORABLE LEARNING SITUATIONS

The foregoing discussion of the many factors related to a child's motivation, and therefore to the type and efficiency of his learning, suggests a set of principles or maxims which can guide the teacher in planning and conducting the activities which help provide motivation in the school curriculum. Some of these guides are as follows:

The proper motivation of learning is one of the basic essentials of any set of educational experiences. Learning seems to be more complete and more efficient when it is energized and directed by strong motivational factors. Accordingly, a large part of the teacher's task is to understand the motives of children and to use them in stimulating desirable learnings.

Motivation must be considered, not as a temporary device to stimulate interest, but as a complex of the needs of the child and the social situation in which he lives. As such, motivational factors are continually shifting as the child develops and as new elements enter the home-school-community pattern. The teacher, accordingly, is alert to the dynamic qualities of motivation and to shifts in patterns affecting behavior and learning.

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[40] Harold H. Anderson, "Domination and Social Integration in the Behavior of Kindergarten Children and Teachers," *Genetic Psychological Monographs*, XXI (August, 1939), 287-385.

[41] Bernice Baxter, *Teacher-Pupil Relationships*. New York: Macmillan Co., 1941.

Because of the large number of factors comprising a motivational pattern, the teacher can never expect a single teaching device or a larger group of procedures to stimulate different children or adolescents in the same way. In general, that teacher is most successful who can provide a variety of purposes and satisfactions in the learning process. Directing interests and activities toward social approval, or aesthetic satisfaction, stimulating mental curiosity relating to both immediate and more remote goals, capitalizing on a variety of interests—all these and other procedures are needed in a well-motivated school program.

The practical school situation may give a greater place to incentives to learning than is theoretically desirable, and the lack of a clear distinction between extrinsic and intrinsic motives may reinforce the use of so-called "artificial" incentives. It is better for the teacher to use positive stimulation in the form of praise and rewards rather than negative stimulation in the form of blame and punishment, but the latter is better than disregarding undesirable behavior. The results of positive incentives are somewhat more predictable than those of negative incentives.

The use of positive incentives must be safeguarded. Competition may degenerate into selfishness, overanxiety, and other personality tensions. Incentives that appeal to only a small portion of the group are not desirable. Privileges and immunities (such as allowing the child to paint if he finishes his arithmetic early) are forms of reward usually achieved by only a few pupils. Classes and schools can be organized so that the goals sought are of themselves continuing values. Opportunities for leadership, co-curriculum activities, work opportunities, and individual and group acceptance of responsibility beyond ordinary duties are examples of such goals.

The capable teacher is alert to signs of bad motivation and low morale. Listlessness, aggressive classroom behavior, inattention, scorn of "baby stuff," and unwillingness to attempt a task are common signs of poor motivation which may demand a rather thorough reorganization of the materials of instruction and a reconsideration of the levels on which they are used.

The readiness program now emphasized in most school learnings at all levels (from preschool through college) is essentially the establishment of proper relationships between capacities and tasks. Whether for reading in the first grade or for chemistry in the eleventh grade, the work of the teacher is to help the pupil achieve so that a new task provides challenge without a feeling of insurmountable difficulty.

One of the more subtle aspects of teaching is that of relating individual goals to group tasks and group goals. The work of a whole class must be based upon the interests and needs of the individuals in the group, but often these diverse interests and needs must be guided toward some sort of consensus so that a sense of sharing in the purpose and work is developed and maintained.

Another subtle aspect of teaching comes in providing a proper balance between successes and failures for the individual. Probably all children need more help in coping with failure than they usually receive. Teachers must be realistic in suggesting that not everyone can win and that goal-setting must be related to past performance. Setting suitable goals can of itself be a satisfaction to most children.

The teacher is concerned in helping pupils not only in their setting goals at suitable levels but in the clarification of goals and the upward grading of goals to more mature levels. Immediate goals usually are more strongly motivating than remote goals, but good methods of working toward goals may help insure the existence of desirable long-term goals. The habit of clarifying goals may help the youth of fifteen years to have more mature goals than he had at age ten.

Finally, motivation is important not only as an energizer and director of learning but as a habit-system in itself. Children learn to respond to the set of motives used in the school. This is one reason why a teacher who appeals to fear fails to get results in a situation where the fear element is removed. It is one reason high grades or stars in spelling sometimes produce perfect spelling lessons but also produce incorrect general writing. Accordingly, the teacher tries for motivation which becomes self-initiating and more independent of extrinsic factors as greater maturity is achieved.

SECTION II

HOW CHILDREN LEARN IN THE SCHOOL ENVIRONMENT

CHAPTER III

HOW CHILDREN LEARN THE MOTOR TYPES OF ACTIVITIES

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The Nature and Kinds of Motor Activities

Motor Activities in Education

Every classroom subject and also every extra-curriculum activity includes motor behavior of some kind. It may be no more than speech or handwriting or a general postural base for social or intellectual activity; in many cases, however, the motor behavior in itself is the most important thing to be learned. It seems helpful to group motor activities into three main categories.

Object-Motor Activities. Behavior of this type is directed primarily toward manipulating, or acting with direct reference to, an object. Other people may be treated as objects of motor response on approximately the same level as are inanimate things. Skill is measured by the speed and precision with which results are obtained. However, it is necessary to bear in mind that object-motor activities often involve problem-solving as well as responses which are also social and which require intelligent understanding of objects and events. In fact, without social and intelligent behavior the motor skills cannot be developed to a high level. This class of behavior includes: the use of tools in industrial and home arts; manipulation of materials such as wood, metals, fabrics, and chemicals; use of measuring and recording devices in the arts and sciences; sports and other physical-education activities in which the primary purpose is use of the body with direct reference to space, equipment, opponents, or partners.

Language-Motor Activities. Body movements are used as symbols or to construct or apprehend symbols. While the movement is essential and must be skilfully performed, the social-intellectual content of the activity is prominent. In this group are found the movements of speech organs, eye-movements in reading, and the movements involved in handwriting, shorthand, typing, telegraphy, commercial art, and mechanical drawing. The motor activity is essentially a means of recording, receiving, or communicating ideas and has no significance apart from its symbolical value. But the skill must be learned to the level of automatic action if it is to serve the thinking processes of the individual.

Feeling-Motor Activities. The dance, the fine arts, instrumental and vocal music are the best examples of this group. There may be responses to objects or people, but the attitudes, feelings, and emotions of the performer are primary. The purpose of the activity is not so much to communicate feelings or ideas to others as to let behavior and inner feeling be in harmony. In the dance, for example, each body part is co-ordinated with the whole, and the total action pattern is guided and motivated from within. The graphic arts, sculpture, painting, and music approximate this condition in their more abstract forms. In all these feeling-motor activities, however, the external world may intrude and require co-ordination of movement with sound, line, color, materials, ideas, or space. The dance may be co-ordinated with music, with ideas, with a partner, or with a group; the graphic arts require brushes, pencil, crayon, and a surface; sculpture requires stone, hammer, and chisel; music requires manipulation of an instrument. When communication becomes a major consideration, the feeling-motor activities change over into the language-motor; when objects and instruments assume prominence as in "stunts," they become object-motor activities.

The Character of Motor Skill

Patterns of Skilled Action. Motor skills have style, form, internal organization, and co-ordination with external objects or events, each in greater or lesser degree. They are not fixed, stereotyped, or invariable. Each person has his own characteristic way of performing any skilled action whether it is handwriting, playing golf, sending telegraphic code, walking, sewing, or anything else. For best results, one performer may not exactly copy another. There are good and bad forms for any activity, even though there is not usually any one best form. This means that the human body as a biophysical organism acts within certain limits of force, range, speed, and other human functioning. Within these limits, however, there may be a large number of equally good "forms" and the effort to find and teach the *one best form* for a given motor activity is futile. Work and play activities are complex, requiring a nice adjustment of each part-activity to the whole movement pattern. When internal organization is good, there is smoothness, grace, rhythm, and ease of action growing out of the fact that energy release, timing, movement through space, and return to a state of equilibrium are properly related to one another. Often the object of motor activity is to do work on an object, person, or material or to produce some other effect in the external world. This fact requires the use of appropriate sense organs to keep the total body activity properly related to the environmental circumstances. There may be dress goods to be cut along a line, a ball to be hit, an auditory signal to be responded to, a person to be dealt with.

Efficient Achievement of a Goal. Motor skills are purposive, even though there may be some relatively meaningless motor acts. Meaningless jerks and twitches are not the subject matter of schools; motor activities directed toward the relatively efficient attainment of valued goals are the objectives of education. Efficiency has no meaning except in relation to a goal; it does mean time-saving and energy-saving in goal attainment; it means energy release, timing, movement through space, and return to a state of equilibrium all nicely adjusted to the demands of the situation and suited to the characteristics of the performer. Of course, efficiency is never absolute. Time and motion studies in industry and the development of modern athletics show that more and more efficient ways of doing old tasks are discoverable. Furthermore, individuals are often content to stop improving at a practical rather than at the expert level.

Intellectual Factors in Motor Activity

Through motor activities the individual puts into overt expression and effect his conclusions about situations and events, including his own feelings and emotions. The paralyzed child is pitiable because thinking cannot lead to action. Through speech, handwriting, sewing a seam, throwing a ball, making a drawing, or some such action, thinking and feeling are made effective.

The motor-learning process itself is an active, thoughtful one. Learning through mimicry, through blind trial and error, through grinding in actions by much repetition is not only wasteful of learning time but next to impossible. The learner may observe a model thoughtfully and learn from it but not copy it; he gets action under way as a novice, makes errors, and thoughtfully considers the relationships between his actions and their results; he may try many times to achieve a goal, varying his activity from trial to trial on the basis of his considered judgment about earlier trials. Perhaps a reason why many motor activities are learned only slowly is that insights into the relationships between movements, and between movements and results, are difficult to attain. The teacher may aid the pupil chiefly by helping him to develop understanding. It is not mere verbal understanding that is needed but rather understanding related to action. A learner may understand the physical principal of inertia applied to inanimate objects but not understand it in relation to the movements of the jumper's legs and arms while in the air; again, he may understand the principle verbally but not be able to apply it in his own actions while jumping. Understanding, growing out of action and reapplied in action, is a major factor in the successful performance of motor activities.

GENERAL CHARACTERISTICS OF MOTOR LEARNING

The Learner's Purposes and Motives

Intent To Learn and Intent To Act. It is necessary to distinguish at the outset between acting for the sake of learning and acting for other reasons. A man may play golf for recreation, health, and social contacts year after year with little or no improvement in score—he is not acting for the sake of learning golf. A child may turn in many written reports in science, social studies, and English over several years of schooling with no improvement in handwriting; he may speak day after day on the playground and in class with no improvement in speech; he walks, stands, and sits but with no improvement in posture. It is intent to learn that results in improvement. When a pupil works at the typewriter, for the sake of improving in typing speed and accuracy rather than to copy an assignment, a little practice may bring much learning.

The Means-End Relationship in Motor Learning. The intent to learn is usually based upon the intent to use the activity for pursuits regarded as worth while. The girl learns to sew because she wants dresses that she cannot afford to buy ready made. The child learns to swim to hold his own with his friends who are swimming. The student of the modern dance learns to dance because of the satisfactions found in movement that fits ideas, feelings, and moods. The means-end relationships are many and varied; they grow out of the life of the child and are not constant for all children or for a given type of motor activity. Sometimes, as a child makes progress in the skill, means and end merge, and the activity becomes immediately worth while without reference to anything else. The teacher is wise to begin at the child and beginner level by seeking to make pupils aware of and to value means-end relationships.

Motivated Learning of Motor Activities. Much use is made of work projects in teaching motor skills. A girl makes a dress, a boy repairs a farm implement, pupils design health posters, a typing class mimeographs a school paper. These projects provide excellent learning opportunities, but the opportunities are converted into efficient learning only when the skills are recognized by pupils and are made objectives of learning intent. When the skills remain purely incidental to the project, they are likely to be insufficiently practiced, poorly understood, and inadequately learned. The project is used as the valued end to motivate the skills; but participation in the project alone is generally insufficient to bring about a high level of proficiency. The situation is very similar to that in athletics where scheduled games, matches, and play days effectively motivate practice, but nonetheless practice sessions are essential.

Special incentives may be used in connection with motor learning with the same advantages and disadvantages as in other kinds of school work (chap. ii). Here, as in other learning, the most valuable incentives are those that are most closely related to the plans and ambitions of the learner, that are most natural and least artificial.

The Course of Development of Motor Skills

The Generalized, Mass Character of Beginning Activity. The child's first efforts at a new motor activity are definitely directed toward the goal as the child understands it; he uses the body as a whole as best he can. This mass activity, when analyzed, may contain no part-activity that is just right and may include many items of behavior that are seemingly irrelevant or contradictory to a good performance. Nevertheless, the total act has pattern and form that is recognizable as an intelligent trial. The goal has been grasped as a whole, a general postural base for the activity is present, and activity is organized, even though poorly.

Some examples may help to make the beginning phase of learning clear. A two-year-old child learning to make a standing jump with both feet together begins by getting an idea of the general pattern from observation of another child. He is then seen to squat low to the floor, flexing at hips and knees, followed by a rapid straightening out of the body; the arms hang rigidly at the sides. His first effort may not raise his feet from the floor at all. A third or fourth trial may include a more vigorous straightening, some lifting of the feet from the floor, and falling over backward. Gradually he learns to maintain equilibrium, to get higher off the floor, and to cover a little distance either backward or forward. The arms begin to assist balance, the head is better oriented, and posture as a whole improves. Within two or three weeks he may be performing an acceptable jump forward.

In learning the hard overhand throw of a ball, a child begins by using the body as a whole to furnish a relatively rigid base oriented in the direction of the throw, the arm as a whole swinging forward over the shoulder. The timing of the release is so poor that the ball may be projected backward, straight up, down at the feet, or forward. Gradually, body flexion, body rotation, stepping forward with one foot, elbow flexion, and wrist action are introduced and perfected. By seven years of age a relatively mature form of throw is present.[1]

In learning handwriting, the child moves all parts of the body. From head to foot, muscular tensions and body movements are clearly present. However, the postural base and arm and hand movements are in general conformity to the goal. As learning progresses all body parts co-operate more and more and the specialized arm and hand actions become more prominent and effective.

The Thinking Process during Learning. The learner begins with a concept, however crude it may be, of the nature of the activity and of the goal to be attained by it. He gains this concept primarily through observation and reflection upon what he has observed. In handwriting he observes script and the writing movements of older children and teachers; in typewriting he observes the machine and its operation as well as the posture and movements of typists; in sketching and drawing he observes sketches and drawings and the tools and equipment of the art as well as the manner of working of teacher and fellow students; in the dance he observes other dancers. From his initial observations he can gain a crude concept of the general pattern of the activity, but details escape his notice. A limited amount of reflection, discussion, and explanation may direct his observation to essential features of the activity. Detailed explanations are out of place. The initial phase of the motor-learning process is evidently one of thinking through the activity on the basis of data obtained from observation and explanation. This first step should culminate very quickly in an initial trial. As successive trials occur they are guided constantly by reflective thinking, stimulated by further observation, discussion, and explanation. It is, however, essential that the teacher bear in mind that understanding develops only slowly, that detailed or involved demonstrations and explanations, especially at the outset, are worse than useless, that pupil trials are the chief source of data for pupil thinking, that the teacher's function is that of directing attention to the essential features of the activity, introducing detail sparingly as progress is made.

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[1] Monica R. Wild, "The Behavior Pattern of Throwing and Some Observations concerning Its Course of Development in Children." Unpublished Doctor's dissertation, University of Wisconsin, 1937.

The Learner's Perception of Objects and Materials. Equipment is seen as something to be manipulated and responded to, but only as provided for by previous experience. For a very young child a ball is something to pick up and carry and to keep safe from the hands of other children; later it is something to roll or to throw and chase; only much later is it something to throw back and forth with another child in a game of catch. A hammer is at first something to pound with, and anything may be pounded; much learning lies back of the perception of it as a tool for strictly limited use. Complex tools, as a sewing machine or typewriter, are vaguely perceived as large objects for the use of adults, but they have little meaning; only after much learning about clothing and textiles is the sewing machine perceived as an object impelling to action in making dresses. The dancer must learn to perceive his body as an instrument for pleasurable action, the swimmer to perceive his hands and feet as propellers. At times the objects and materials are intriguing or frightening because of their novelty and limited previous associations, and the first learning may necessarily be that of developing a closer general acquaintance to discover new possibilities of action with reference to them. Certainly, as skills are learned, the objects and materials are perceived in new ways, and new perceptions open the way to advancement in skill.

Changes in the Learner's Purposes and Motives. The reason for beginning an activity often remains in the background as a general motive for continuing it. However, many new motives emerge as the learning progresses. First motives are highly general, e.g., swimming because of pleasure in the water or to be one of the gang. Then one swims to beat a competitor, to swim across the lake, to pass a Red

Cross test, to master a given stroke. The beginner cannot have the advanced motives any more than he can have the advanced skills, but he must acquire them if he is to become an advanced performer. Advancement in purpose and motive is obviously connected with general social and mental maturing which make it possible to see the skill in a new light. The four-year-old artist wants to draw a cat, a dog, or a house. A few years later he may use an animal to express a mood, or a human figure to reflect his concept of womanhood.

Changes in the Learner's Movement Pattern. Beginning movement is of the body as a whole with rough adjustment to the purposes of the activity. In a sense it is wholly correct, in that it is as much as can be expected of that child at that time; in another sense it is wholly wrong, in that no detail of it is right when judged by mature standards. Progress consists of gradual improvement of the activity as a whole through revision of detail, keeping in mind, however, that no detail can be just right until the whole is just right. Progress may occur unevenly, but it must occur all along the line. The learner gradually adopts a style which is characteristically his own. Within the limits of that style his movements vary from trial to trial, the total range of variation decreasing as skill increases. At no time, even at the expert level, does variability of response disappear; motor skills are not fully stereotyped or fixed. Time-and-motion studies in industry have established this fact. Continued improvement seems to depend upon taking advantage of the variations in performance by insight into their consequences under conditions of good motivation. When the style as a whole is not a good one, then a new start must be made with a temporary reversion to something approximating the beginner level. Getting a good start refers to starting within the limits of a good style rather than to having correct movement details. Getting started wrong refers to a start directed toward a bad style rather than to making errors in movement details.

Techniques for Studying and Recording Progress. Knowledge about motor learning and specific assistance to a learner both require satisfactory methods of observing and recording performance on successive trials. The observations may be either of the learner in action or of the product of his performance. The records may include notations of good work and of errors made. Some observations may be highly objective, such as those of time per unit of work, quantity of output, specific faults in the product. Other observations are subjective, such as those of style of movement and many qualitative characteristics of the product. Obviously observations should be assisted as fully as possible by proper use of recording devices, especially when the observation is of the learner in action. Motion pictures and stereoscopic pictures have proved especially valuable, although expensive to use. The stop-watch has proved invaluable for timing individual motions. The teacher must devise observation techniques appropriate to the skill under consideration and especially avoid the tendency to base records on observation of the product only. The typewriter leaves a record of good and bad work, and time per word is easily calculated, but such a record is wholly inadequate to guide instruction. The learner must be observed as he sits and works at the typewriter, for typing is a matter of skilled motion. Handwriting quality may be judged by comparison with a scale, but observation of the learner's motions while writing is essential in teaching him. In some motor activities, such as the dance and diving, the action itself is the major consideration; in these cases there is no substitute for direct observation of the learner in action.

Learning Curves

A learning curve is a graphical representation of performance data collected at fixed intervals during the learning period. It depends upon a quantitative record. It is obviously an incomplete record and reflects all the errors of measurement. The record is more complete when several learning curves based upon several types of data are used.

Speed and Error Curves. Speed data may be in terms of units of work done in a fixed time, as words written per minute, or in terms of time required for a fixed amount of work, as time for a hundred-yard dash. The choice between the two kinds of speed data is a matter of convenience and suitability to the activity. Speed curves tend to be negatively accelerated, that is, show rapid initial rise with gradual slowing down as a limit is approached.

Error data may be in terms of number of errors made while doing a fixed amount of work, as number of defective parts per hundred, or errors made within a fixed time, as typing errors per minute. Error curves tend to be negatively accelerated, that is, they show rapid initial decrease in number of errors with gradual approach to zero.

It is a common practice to combine speed and error curves. Usually this is done by applying a penalty for errors to a speed score, as subtracting from the speed score five words for each error in typing to get a net speed score. The resulting curve is usually negatively accelerated when the penalty is light and positively accelerated when the penalty is severe. This practice seems undesirable in directing learning, since it covers up data about skill of which teacher and learner should be informed.

Other Performance Curves. The kinds of data used for learning curves are limited only by the nature of the activities and the ingenuity of the investigator. Distance per stroke in swimming, number of balls caught in succession without error in juggling,[2] stroke score in golf, batting or fielding percentage in baseball, etc. In general, when a method of scoring imposes a light penalty for errors, the resulting curve is negatively accelerated; when the error penalty is severe, the curve is positively accelerated. Thus a curve of any desired degree of acceleration may be obtained by appropriate choice of scoring technique. It is apparent that a slowly rising score is discouraging while a rapidly rising score is encouraging. This suggests that motivation is better when the scoring technique is adapted to the level of advancement of the learner so that score will show appreciable change in skill.

Irregularities in Learning Curves. Actually obtained curves never show smooth progress. There may be either gain or loss in score from one performance record to the next. These minor fluctuations have been attributed to variations in motivation, physiological condition, working conditions, and the like, although detailed proof is difficult to obtain. There may occur prolonged periods of little or no progress, or even slumps in performance. These may be attributed to prolonged lapses of motivation, emotional disturbance, ill health, or other interference with learning. It has been suggested that such plateaus may be caused also by change in the nature of the skill involving a gradual shift from one general style of performance to another. This cause of plateaus was first described by Bryan and Harter[3] in their studies on the telegraphic language. Obviously any plateau, for reasons given here, is avoidable if the conditions causing it can be eliminated. In many cases this seems possible. The following discussion of limits is related to this matter.

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[2] E. J. Swift, "Studies in the Psychology and Physiology of Learning," *American Journal of Psychology,* XIV (1903), 201-51.

[3] W. L. Bryan and Noble Harter, "Studies in the Physiology and Psychology of the Telegraphic Language," *Psychological Review,* IV (1897), 27-53; VI (1899), 346-75.

The Concept of Skill Limits

Physiological Limits. It seems clear that there is a final limit beyond which the human organism cannot go in speed, strength, endurance, and accuracy of performance. It is unlikely, however, that this limit is approached very closely by more than a few humans in any except very simple activities. For example, the absolute limit of to-and-fro movement of the index finger is probably ten per second for the average person. If this speed could be attained in typing, one-hand typing with one finger would make six hundred strokes per minute, which is considerably faster than most skilled typists attain using all fingers on both hands. The limiting factor is obviously not that of muscular speed alone but is found also in word perception, language facility, and machine structure. In other words, typing is a highly complex skill involving motor, perceptual, language, and mechanical factors in such combination that the absolute speed limit cannot be determined except empirically. Improvements in typing method, typewriters, perceptual, or language skills might well raise any previously attained high scores. During the past century the time for the 220-yard high hurdles has been cut almost in half, but not because of better men or more practice; the time reduction has occurred because the method of running has been radically changed. In a similar way, world's records in the high jump and pole vault have increased markedly. Time-and-motion study in industry has centered about systematic investigation of movement for the purpose of improving working method and equipment and thereby raising production records. For most learners the attained limits are not physiologically imposed.

Methodological, Mechanical, and Material Limits. Learning on his own without instruction, a man may learn to type acceptably using only the index finger of each hand with no definite assignment of portions of the keyboard to each hand. He may attain good accuracy and a speed of forty words a minute by this method, but near that point he reaches his "method limit." If he shifts gradually to a better method, say by using more fingers with definite assignment of characters to each finger, the "plateau" in his learning curve will gradually give way to a new rise followed by a new plateau as the new-method limit is reached. If at a later date he purchases a new machine with an improved keyboard, he will experience a "slump" while learning the new keyboard followed by a rise in performance and will, after a while, reach a new and higher plateau. After working for a time on the new level he may purchase an electrically operated typewriter and again experience a rise in performance until a new plateau is reached. Learners in all motor skills have similar experiences. Limits are set by method, equipment, and working conditions. The teacher's function is that of providing expert advice which will lead to the early adoption of good methods, equipment, and working conditions so that attained limits will be high, but, clearly, improvements may be expected from generation to generation.

Practical and Motivational Limits. Records of skill in free-throwing kept by a basketball coach of a university team showed marked improvement by Freshman players, lesser but clear improvement by Sophomore candidates, a little improvement by Juniors, and almost no improvement by Seniors. But it has been observed that college graduates entering professional basketball again show clear improvement. It may likewise be observed that a stenographer takes a job requiring moderate speed in shorthand and typing and successfully holds a job for a few years but with little improvement. However, when an incentive in the form of a better-paying position arises, a rapid increase in skill may occur to meet the demands of the new job. It has been observed that handwriting quality is highest in the upper grades and deteriorates thereafter, probably because at older ages speed is more important to the child than quality. We usually learn a skill as a whole, and the special aspects of that skill, to a level that meets the requirements of the immediate situation. We learn rapidly while trying to make a team but let down when position on the team is secure; we learn rapidly in preparing for a job but stop learning when its requirements are met; we learn while teachers or circumstances press us to do so but stop learning when the necessity has passed. Only in an area of great importance does one have the time or the motives needed for attainment at the highest level.

High-Level Learning

Convenience of investigation has led psychologists to be concerned largely with the early stages of learning. We know how motor learning begins much better than we know how it progresses at the expert level. Athletic coaches and coaches of speed typists have generally treated their personal discoveries as trade secrets. Teachers of high-level musicians and artists have not usually analyzed their teaching techniques or the details of the improvement of their pupils. Only a few principles seem clear. Motivation must be maintained at a high level through intense liking for the activity, through ambition, and through a certain measure of success. Improvement must be recognizable to the performer by some clear qualitative or quantitative cues not usually appropriate at lower levels of performance. Refinement of equipment is more important than at lower-skill levels. Fine and detailed analysis of movement is essential, which may be self-analysis, analysis by teacher, or objective movement record. Practice periods may be far longer than for those of lesser skill. Intense preoccupation, resistance to distraction, and irritation by perceived distraction are characteristic. Fineness of adjustment to varying circumstances, rather than fixity and stereotypy of movement, is the objective. Intellectual and cognitive factors are increasingly important.

Retention of Motor Skills

Retention of motor skills undoubtedly occurs in much the same way as retention of other learned materials. Good learning is the first condition of good retention. The following factors influencing permanence of learning may be mentioned in summary form. Meaningful skills, that is, those that fit into a context of other useful activities, are retained well. Overlearning enhances retention. The simpler and more widely useful motor skills are commonly used extensively and thereby overlearned. Distributed practice is more effective for retention than learning or overlearning done all at one time. Learning with intent to retain is more effective than that done for temporary use. Affectively toned activities, especially the pleasant ones, seem to be better retained than the affectively indifferent ones. Activities engaged in during the time following learning may and often do impair retention. This interference is known as *retroactive inhibition*. The conviction has been growing that this is the main cause of forgetting. Retroactive inhibition is apparently greater when the second activity is similar, but not too closely similar, to the first-learned activity. Similarity may be either of form or of meaning. When the original task is thoroughly learned, retroactive inhibition is at a minimum; likewise, when the second task is thoroughly learned. Apparently the time at which the second activity is introduced is related to the amount of retroactive inhibition but in a manner not well determined. It seems in general that the amount of retroactive inhibition is determined by the extent to which relations are built up between the original and the later activity and also upon the closeness of organization of each activity. The more each activity has an independent and well-knit organization of its own, the greater the resistance to retroactive inhibition; the more an activity tends, through lack of internal unity, to merge with later-learned activities, the more it is forgotten. Apparently, after a period of practice, we should rest for a few minutes before beginning a new activity; the new activity should be as dissimilar as possible to the first. We should strive for a high degree of meaningful organization and thorough learning of each activity, and we should practice last the activity whose use is called for on any important occasion. We must, however, anticipate that skills will be made over with the passage of time just because other motor activities that interfere are unavoidable in normal living. Occasional review, use, and relearning are essential for good retention.

ECONOMY OF TIME AND EFFORT THROUGH GOOD LEARNING AND INSTRUCTIONAL PROCEDURES

Initiating the Activity

Favorable Condition of the Learner. Certainly the learner should have achieved a physical, mental, and social maturity suited to the activity. His strength, endurance, and muscular speed must meet the demands put upon them. He must be intellectually able to perceive the important relationships involved in materials and movements and must be able to develop understanding of the purposes of the activity. In those motor activities involving social relationships, as in team games, social maturing must have gone far enough to enable him to respond properly to other people and to subordinate himself to the group. He must be in good health and not unduly fatigued at the time of practice. He must be motivated to want to learn.

Good Equipment, Materials, and Social Environment. Often equipment itself indicates action. A club is for striking, a pool of water invites one to jump in, a pencil is for marking, a smooth track is for running, a companion invites group activity. Cleanliness, attractiveness, and convenience of equipment and surroundings are directly related to interest and motive. Equipment itself gives instruction. Adaptation of environmental factors to the age, interests, and abilities of the learner as well as to the requirements of the activity is an important function of the teacher.

Modes of Initial Instruction. Learning under instruction is based upon a communication process between teacher and pupil. The means of communication are: verbal directions (oral, written), demonstrations (by teacher, fellow learners, photographs, diagrams, models, etc.), manual and mechanical manipulation of the learner. Each may be used alone or in combination with the others. Perhaps because of convenience, teachers tend to overuse verbal directions.

The use of verbal instructions at once raises problems of comprehension. Verbal descriptions of movement are often next to impossible. When the teacher tries to make them reasonably exact and complete, they are lengthy, tedious, and uninteresting; they usually require a technical vocabulary unfamiliar to the learner, especially to beginners. Even though simple language can be chosen at times, the concepts and movements described are unfamiliar to the learner. In general, verbal directions have little or no value to beginners except for purposes of directing observation, and they may create feelings of uncertainty and frustration tending to block effective trial. Such expressions as "Watch how I move my hands," "Look especially at the feet in this picture," "Observe how he turns his head," "Notice the length of stride," are appropriate, but detailed descriptions of the movements are not. Furthermore, only one direction should be given at a time. As the learner makes progress, more technical words may be introduced *as a means of increasing vocabulary* in the area but without any immediate value as aids to instruction. In general, learning under verbal direction without other guidance is little better than trial-and-error learning for beginners. It increases in value as the learner makes progress and especially as he builds up a vocabulary descriptive of the activity. It may be used more extensively with advanced students.

Some form of demonstration is the fundamental form of instruction for beginners and retains high value at all levels of skill. The learner's effort is not to mimic, or exactly copy, the model. In fact exact copying is possible only when the observer is himself highly skilled. From observation of demonstrations, the beginner discovers purposes and goals of the activity, the general use of materials and equipment, and the general form of the activity and gets suggestions about how to initiate activity on his own. As he makes progress, demonstrations may become more and more concerned with detail, but in the beginning they should show only the more general features of the skill. Since the learner sees only the general form of the activity, undue concern about perfection of the model seems out of place. The teacher with ordinary skill, the more advanced student, and even the fellow learner may give acceptable demonstrations. When slowed-down demonstrations are needed, live models cannot be used effectively, since slowing down any movement changes the activity pattern and falsifies it as a whole. Diagrams and slow-motion pictures give good results.

Manual or mechanical guidance is intended primarily to give the learner a kinesthetic perception of the activity or to carry him safely through a dangerous operation. Its usefulness is limited by difficulty of application as well as by the fact that the learner too often takes a merely passive attitude toward the activity. When he enters actively into the performance, assisting where he can, the instruction is effective.

Whatever the form of communication used by the teacher, the pupil learns only if he actively perceives, thinks, and plans during the instruction. The objective is to prepare him for action as rapidly as possible. Usually the procedure for initiating a new motor activity should be, *first,* general acquaintance with the equipment, materials, and surroundings; *second,* one or two simple demonstrations of the activity with extremely little verbal direction; *third,* beginning trials by the learner. Let the first trial occur within a few minutes after starting instruction.

Maintaining Good Learning Activity

Most motor activities require extended practice. The maintenance of motivation, the adaptation of instruction to changes in skill, the management of practice time, the organization of activity sequences, estimates of progress, and many other problems arise during the course of learning.

Management of Practice Time. Over the past forty years numerous experimental studies[4] have shown that for motor-skill learning short practice periods are more economical of practice time than are long ones. Apparently this is true in part because the short period favors higher motivation, better physiological condition, less retroactive inhibition as between phases of the skill, favorable reminiscence,[5] and more concentrated effort. The experimental findings must be modified by teachers to take account of time wasted in dressing for the activity, getting equipment ready and putting it away, and the need for attaining a given skill level within a stated period of months. It is probable that teachers tend to make practice periods too long rather than too short. While a person may engage in an activity for recreation for a long period, the time used specifically for learning should be divided into short periods.[6] With a few notable exceptions, coaches of athletic teams probably hold too long practice sessions. Typing and shorthand should probably never be practiced for more than a half hour at a time. Young music pupils should practice in 15- to 30-minute periods, but never longer, up to high-school age. Where the skill-learning is only a small part of a total study activity involving much thinking and planning, the learning period can certainly be much longer. By properly working for all the varied objectives of school subjects, sufficient variety may be introduced into the usual high-school class period of 40-60 minutes so that it can be used effectively by all teachers, but the part given to motor-skill training should rarely exceed half of the total time.

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[4] Howard L. Kingsley, *The Nature and Conditions of Learning*. New York: Prentice-Hall, Inc., 1946. See pp. 246-50 for a good, brief summary of experimental evidence on the length and frequency of practice periods.

[5] *Reminiscence* refers to increase in performance score after a period of no practice. It has been variously explained as due to removal of fatigue, removal of inhibitions built up during practice, fading of slightly learned wrong habits.

The best frequency of practice periods has been investigated extensively. The findings are simply stated. Twice daily, daily, and three times weekly are good arrangements. Once a week is probably not quite often enough.

Part-Whole Learning: The Problem of Activity Organization and Sequence. Some motor activities are closely knit units, others are loosely organized aggregations of units. A swan dive is an example of the first; a game of baseball, of the second. Between these two extremes are activities of all degrees of organization. It seems clear that the closely knit unit should be first attacked and practiced extensively as a whole. The units of the loosely organized activity may be, and often are, separately learned over a period of years and then fitted together into a new activity. The child learns to throw a ball, to catch it, to strike with a club, to run, to slide, to accept special assignments in a group. Each of these activities is a self-sufficient whole when learned. Baseball is a later and higher level organization. However, when baseball is begun, it is essential that the concept of the game as a whole be developed at the beginning; then each of the part-activities may be further learned, modified, and perfected in relationship to the game as a whole.

When a game such as tennis is begun, it is found to contain many rather unitary part-activities never previously learned as such. In activities of this kind it is probably well to begin with a concept of the game as a whole and some preliminary trial in it as a whole. Very soon, however, special practice on part-activities must be begun. As each part is moderately learned, it should be applied in further trial of the game as a whole. This alternation of part and whole practice carries all parts along approximately together and keeps them constantly adapted to the requirements of the total activity. This procedure also assures that no important part is underlearned, that practice is constantly motivated by reference to the whole game, that transition between part-activities is learned as the parts are learned, and that meaning and relationship are preserved and developed at all stages of skill.

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[6] Coleman R. Griffith, *Psychology and Athletics*, pp. 91-93. New York: Charles Scribner's Sons, 1928.

In general, fineness of analysis and practice on detail should come late in the learning process; early learning should be concerned with complete meaningful units.

Sequence of related motor activities deserves consideration in any well-planned program of learning. Unfortunately, little that is definite can be said about it. In learning to swim, which stroke should be learned first, and which next? We have custom and opinion but a scarcity of facts. In learning handwriting, should a child first learn block printing, then manuscript writing, and last cursive writing? The trend today is in that direction, the supporting evidence coming as much from relationships between handwriting and reading as from considerations of writing skill. Many studies are needed within all areas of motor activity, but until they are made we shall have to follow the dictates of authority.

Relative Emphasis upon Speed, Accuracy, and Form of Activity. The standard recommendation is to work first for accuracy or form and let speed increase gradually with practice. This recommendation has been questioned as a result of the discovery that fast motion is unlike slow motion in neurophysiological pattern and in form. The learner who works slowly cannot use the same form that he will use when he becomes a fast performer. While crucial experimental work is limited and not well controlled,[7] there is apparently some merit to the recommendation that practice should be at full speed from the beginning. A compromise recommendation is "speed with control." In typing, for example, one investigator with wide teaching experience advises typing at all stages of learning as fast as can be done with one error per minute. Certainly fast movement is learned only when fast movement is tried.

Using Rhythm in Learning Motor Activities. Rhythm refers to the internal organization of movement units and sequences of units, in terms of time and intensity, of equilibrium of forces, tension, and energy release. Starting at a state of rest, tensions build up, and energy release and movement begin and build up to a high point, then diminish to a state of rest. The complete series is the movement cycle or rhythmic unit group. A complex activity may include many movement cycles. A swimming stroke is a movement cycle, but it contains movement cycles of legs, arms, head, and breathing superimposed the one upon the other. A stroke on the typewriter or piano key is a movement cycle; typing and piano playing consist of series of such cycles. An intriguing problem has been that of how best to understand and use the facts of movement organization in teaching and learning. Since the simple movement cycle apparently centers about the high point of energy release, the learner should likely focus his activity upon this high point, whereupon beginning and end of movement will fall into proper place. A series of movement cycles, likewise, has a high point, that is, an accented phase. It seems well to make this high point the center of organization of the more complex activity. For example: A word is written in longhand or on a typewriter with an "accent"; force is not expended evenly over all letters and they do not have even temporal spacing; likewise phrases have accentuated words or syllables. Good teaching might well accept these accents as organizing centers for movement rather than work against them by emphasizing evenness of timing and force.

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[7] Mary Sturt, "A Comparison of Speed with Accuracy in the Learning Process," *British Journal of Psychology,* XII (1921), 289-300; see also August Dvorak, Nellie L. Merrick, William L. Dealey, and Gertrude C. Ford, *Typewriting Behavior,* chap. ix (New York: American Book Co., 1936).

Because of individual mechanical, neuromuscular, and habit patterns, two learners may differ in the details of internal organization of a given movement. It is not surprising, then, that studies of the use of imposed musical rhythms have shown only indifferent effects of music upon the learning of motor skills. For best results, music would have to be composed to fit the skill and to fit the person. The student of the modern dance emphasizes just this point in asking for music composed for the dance and the dancer. The best conclusion seems to be that careful study of movement organization will yield rich returns but that imposition of external rhythm patterns has little utility in aiding learning.

Appraisals of Progress. Motivation can be maintained only when the goal of activity is known and progress toward it can be estimated meaningfully. Measurement devices appropriate to the activity and to the stage of skill must be used. A given device, as percentage of accuracy, may be a good means of showing progress at the beginning and intermediate levels of skill but may show little or no progress for the advanced student; another device, such as amount of work in succession without an error, will stimulate even the expert. Day-by-day comments, no more and no less detailed than called for by the learner's skill level, are the stock in trade of the good teacher. Occasional use of standardized tests is helpful. It is by thinking over his actions in relation to results that the learner makes progress; good appraisal furnishes the data for good thinking.

Practice under Conditions Approximating the Real. A student may make an art poster to turn in to the teacher for a grade or to post in a cafeteria to influence the food choices of fellow students; a typing student may cut a stencil as a class exercise or prepare it to announce the program of a local businessmen's meeting; members of a basketball team may practice free throws when fresh before practice period or try them in the middle of the period when fatigued from scrimmage. Reality of purpose and working conditions are undoubtedly contributing factors to effective learning. Artificial rewards, punishments, and working conditions are of doubtful value.

Some Special Techniques and Devices. Motor learning is basically perceptual, especially kinesthetic. Blindfold practice in basketball free-throw shooting, putting golf ball, etc., has been reported as yielding good results, probably because of the greater forced dependence on kinesthetic perception.[8] Practice before a mirror for dancing, posture, and other activities where objective results are difficult of measurement has been used with success. Photographic records of the learner, while expensive, give excellent data for his guidance. Where applicable, paper tracing records of movement have considerable value. Whatever can be done to aid the learner to perceive better his own actions and to judge them with respect to results is worth doing.

Use of Opportunities for Transfer. After the earliest months of life, no learner ever starts from scratch to learn a skill. He has back of each new activity a wealth of previous motor skills. To a considerable extent the ease of learning a new activity depends upon how well he can adapt and apply previous skill in new situations. One renowned teacher of tennis relates the overhand serve to driving a nail in a wall high overhead, and pivoting on the tennis court to turning about on a revolving stool. The boy who has cracked a whip uses a similar wrist snap in driving a golf ball. While the previous skill is rarely, if ever, used in original form, it may be adapted readily to the new activity, if only the learner (with the aid of the teacher, perhaps) see its applicability. Of course mistaken application leads to wrong action. Good teachers need breadth of motor background as well as specialized skill.

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[8] Griffith, *op. cit.*, pp. 66-69.

Reflective Thinking in Motor Learning. Throughout this chapter we have emphasized that motor learning is always perceptual, cognitive, and rational, as well as often social. To regard it as a merely mechanical process is to be grossly in error. Kinesthetic perception is fundamental, but responses to objects and persons demand vision, hearing, and tactual impressions; sensory components are important, but they must be ordered, interpreted, and acted upon; choice between rival styles of performance and their adaptation to individual peculiarities of the learner often requires problem-solving of the highest order. Some instructors have seized upon one phase of the process, as the kinesthetic or the affective, and have built a teaching "system" around it, but such a system is as one-sided as was the view of some psychologists who once stated that rats used only kinesthesis in learning mazes because blind, deaf, anosmic rats could learn mazes. We have muscles and use them in motor learning; we have kinesthetic sense organs, eyes, ears, and skin senses and use them all; we have language and use it; we have thinking processes and use them. We collect data about action from all available sources and use them in learning motor activities as fully as our individual intelligence permits. Reflective thinking is the key to learning in this as in all areas.

THE INDIVIDUAL CHILD AS THE LEARNER

Age Differences. It is obvious that developmental factors associated with age are related to ability to learn and to perform many motor activities; muscular strength, endurance, speed, height, weight, body build, proportion of parts, and resistance to injury are all related to age. Less tangible are willingness to try, desire to conform, concern about appearances, and the like. In general the years from eight to twelve are golden years for skill learning, if those activities demanding primarily strength and endurance are ruled out; after about sixteen years, learning can proceed according to adult standards in all areas. The adult may often be less willing to try and have less time for trying than the child, but until physiological deterioration sets in he may begin and learn well any new motor activity that takes his fancy.

Sex Differences. Until puberty the only inherent difference of consequence is slightly lesser muscular strength on the part of girls. Apparently other differences are accounted for by difference in interests and social pressures. After puberty, the broadening of the pelvis reduces the girl's ability to run; muscular strength and speed of muscular contraction drop farther behind that of boys; subcutaneous fat gives the girl's form a smoother outline more pleasing to the eye in such activities as diving and the dance. Altogether sex differences have little relationship to ability in motor work and play activities except that, where extremes of strength and speed are important, boys have some advantage.

General and Special Motor Aptitudes. The concensus of research indicates that there is no unitary general motor ability and that the ability to learn any specific motor activity has a low positive correlation with general intelligence; the more specific the activity the lower the correlation and the more complex the activity the higher the correlation. Special motor aptitudes are undoubtedly related to special physical factors such as sensory sensitivities, length and thickness of bone, proportion of body parts, height, weight, reflex speed, etc. The most useful motor test is usually the "miniature"-type test where a small stylized sample of the activity in question is used. The intercorrelations between special motor abilities are low and positive, being higher for complex than for simple activities.

Background of Motor Experience. Richness of background is as important in learning motor activities as in other areas of learning. Freedom of movement in a varied and stimulating environment all through childhood builds up a rich background of motor skills which can be drawn upon when learning skills in later life. Along with the specific skills, such things as attitudes toward activity, physical vigor, and methods of attack upon motor activities can add much to the ability to learn new activities.

SUMMARY

Motor activities are used by individuals to deal directly with environmental objects and circumstances, to apprehend and construct symbols, and to secure aesthetic experiences in harmony with feelings and attitudes. Motor skills are more or less variable and efficient individualized ways of goal attainment. Through motor activity the individual makes his thinking effective, and through perceptual and thinking processes he develops motor skills.

The child learns motor activities through observing materials and actions, but without copying what is observed; he makes trials and uses the perceptions of himself in action as data for guiding later trials; his learning includes reflective thinking, but verbalized understanding comes late in the learning process. Motor activities are learned as means to ends, but intent to learn the activity must accompany interest in the end result if learning is to be efficient. Progress in skill may be temporarily or permanently stopped by a number of conditions such as ill health, loss of motivation, poor equipment, or poor method or style. High-level learning has not been sufficiently studied; it requires specialized adaptation of learning techniques. Retention is based upon good initial learning; it is interfered with by the disruptive effect of new learning similar to, but partially different from, the old.

Efficient learning is based upon proper relationship between the demands of the activity and the characteristics of the child. Factors associated with age, such as strength, speed, endurance, mental and social maturity, have important relations to motor activity. Sex characteristics have little significance in most cases. Motor abilities are specialized rather than general and have a low positive relationship among themselves and with general intelligence.

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CHAPTER IV

HOW CHILDREN LEARN INFORMATION, CONCEPTS, AND GENERALIZATIONS

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What the Chapter Is about

When the child in the primary grades comes to recognize "cat" as the printed symbol for the animal he plays with, he engages in the kind of learning to be discussed in this chapter. So does he later in school, when he gains control over the meanings of numbers and the computational skills of arithmetic; when he masters the facts and relationships of history and geography and develops the ability to use them effectively in thinking and in communication; when he grasps the vocabulary, the facts, and the principles of biology and physics and becomes able to interpret more intelligently the scientific aspects of his culture.

Instances of the kind of learning in question could be multiplied without ceasing, for their number is myriad. Some of the words used to designate the products of this learning have been mentioned: word symbols and meanings, intellectual skills, facts, relationships, principles. Others are: information, concepts, ideas, laws, generalizations. When these learning products are analyzed in detail into the specific words to be known, the specific generalizations to be developed, and so on—when this is done, they are found to make up the bulk of the traditional subject matter of the school.

Yet, it would be a serious mistake to suppose that such learning is limited to the school, that it begins in Grade I or the kindergarten and stops with the last contact with systematic instruction. On the contrary, the infant soon starts to form ideas and to acquire language forms with which to fix them; and with equal assurance, the adult continues the process indefinitely. In the end, the products of this learning comprise most of the mental content and machinery of the individual; and they set him apart from the mature members of subhuman species by a gulf that is not to be bridged.

Relation to Other Kinds of Learning

The most evident characteristic of information, concepts, and generalizations is that they are predominantly verbal: They are learned chiefly through the agency of words, and they are used most commonly through the same agency. In the school we deal with the Mississippi River, not as an immediately sensible object, but with the idea as symbolized in words. We deal with historical events of past centuries, not as happenings which we can witness, but in the form of facts and relationships which are recorded, studied, learned, remembered, and used by means of words. Outside of school we acquire the vocabulary of daily living, of work, and of play, together with the rules under which we must operate and associate with others—all mainly through words. Indeed, so strikingly clear is the role of the verbal factor in the acquisition of information, concepts, and generalizations that one might be tempted to entitle this chapter, "How Children Learn Verbally."

To do so, however, would be to expose one's self to serious error. If ideas and generalizations were exclusively the products of language-learning, then obviously, without benefit of language, there could be no ideas and generalizations. But this inference is contrary to fact. There are known to be such mental constructs as nonverbal ideas and generalizations; and these constructs are known to function not alone in the prelanguage behavior of infancy but throughout the whole of life. In view of these facts, nonverbal ideas and generalizations merit attention in this chapter, and they will be accorded this attention at a later point (pp. 124-25).

Another error sometimes made in thinking about the acquisition of information, concepts, and generalizations needs to be corrected at the outset. This error is to suppose that learning in these areas is separate from, and independent of, other kinds of learning. Elsewhere in this yearbook are to be found chapters on the learning of motor skills and of emotionalized forms of behavior. Learning is thus differentiated into three main types: ideational (considered in this chapter), motor, and emotional; but the differentiation is purely a practical one, made for convenience of discussion. Actually, the three types are closely interrelated.

Consider, for example, the idea "hammer." "Hammer" is, of course, a word, and the word stands for a readily identifiable object. But no one can have a richly meaningful concept of "hammer" without having used a hammer; that is, without having engaged in motor activity involving a hammer. Likewise, the idea of "hammer" includes some sort of attitude toward the object. The emotional experiences, pleasant or unpleasant, which one has had with hammers are also integral parts of the idea itself. Almost any idea, if it be analyzed far enough, will be found to be partly verbal, partly motor, and partly emotional. And the same statement may be made concerning the information and the generalizations which it is the school's business to help children to acquire.[1]

The implications of this interrelationship between the ideational, the motor, and the emotional in learning are very important for teaching. Recognition of the interrelationship should, among other things, combat in some measure the practice of accepting empty verbalism (glib, but meaningless, language performance) as the end-product of teaching information, concepts, and generalizations.

The Relativity of Ideational Learning Tasks with Respect to Meaningfulness

It has been suggested above that learning tasks of an ideational character are exceedingly numerous. They are also of infinite variety with regard to the amount of meaning which they involve. Accordingly, it is helpful to think of particular facts, concepts, and generalizations as occupying points on a continuum of meaningfulness, such as that illustrated.

(Zero) 0 · · · · · ———————————————— · · · · N (Maximum)

At the left end of the scale, near the 0-point, are ideational learning tasks with a minimum of meaningfulness. Here belong the fact that "2" stands for the word "two," that "d" follows "c" and precedes "e" in the alphabet, that this particular river is named the Euphrates, that Napoleon was a native of Corsica, that "to be" and "to run" are known as "verbs." There is no rational necessity why the numeral "2," and it alone, symbolizes "two," or why "d" follows "c" and precedes "e." (Of course, all numerals and letters have a history which partially explains their present forms.) Nor is there any logical reason why this river is the Euphrates, or why Napoleon's birthplace was named Corsica, or why "to be" and "to run" are designated "verbs." At least, logical reasons are not usually available to the learner at the time he learns these items. So far as he is concerned, all the relationships mentioned are purely arbitrary, and learning is purely associative with little or no aid from meanings.

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[1] Lou LaBrant, "The Relations of Language and Speech Acquisitions to Personality Development," *Mental Hygiene in Modern Education*, chap. xii. Edited by C. E. Skinner and P. A. Witty. New York: Farrar & Rinehart, 1939.

At the upper end of the scale near N (maximum of meaning) and far removed from the arbitrary associations just mentioned are ideational learning tasks which are heavily freighted (or should be heavily freighted) with meaning. Here belong such items as the idea of "two," the concept of "justice," the law of diminishing returns in economics, the generalization that heat tends to accelerate chemical processes, the moral principle that "honesty is the best policy." "Two" is a precise, an exact, way of measuring a particular quantity regardless of the quality being measured. "Justice" describes a common feature of behavior in a great many different situations; however, a feature which is not directly observable *in* the behavior but which is put there by the observer. The law of diminishing returns is a sophisticated generalization of relationship among events, an abstraction which is no more than words if it is not understood. And the scientific law respecting heat and chemical processes is also an abstract formulation which is devoid of significance and functional value if it is not invested with meaning; and the same kind of statement can be made concerning the principle respecting honesty. Hence, these items are located toward the right end of the scale of meaningfulness. And between them and arbitrary associations at the other end of the scale lie all other ideational learning tasks.[2]

Degree of Meaningfulness Dependent upon the Learner

Nothing that has been said should be interpreted to imply that ideational learning tasks can be assigned absolute and invariable locations on the continuum of meaningfulness. There is nothing within learning tasks to determine once for all the places they occupy on this scale. True, what have been called arbitrary associations cannot be moved very far to the right, for they afford slight opportunities for increases in meaningfulness. But the position of the law of diminishing returns, to select a single example, may vary over a wide range on the scale. It may even fall well to the left when it is memorized as a series of arbitrary associations between words. On the other hand, as the law takes on meaning, it moves farther and farther to the right. If the law is accepted as of vital importance in education, it should eventually come to a place near N.

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[2] Morrison was especially sensitive to the dependence of instructional procedures upon relativity of meaning. In this connection his chapter, "The Language Arts," is well worth study. Henry C. Morrison, *The Practice of Teaching in the Secondary School,* chap. xxiii. Chicago: University of Chicago Press, 1931 (revised).

Several factors contribute to influence the place on the scale of meaningfulness at which any ideational learning task will be found. One such factor has been mentioned in passing. Society may regard a given task as an essential item in education, formal or informal, and insist that it be learned with a maximum of meaning. So far as society is concerned, then, the item is near N. But society's will in the matter does not *put* the learning task there. An even more decisive factor is the learner himself. There is no way in the world to *give* meanings to the learner. Meaning comes only through individual experience, and experience is not wholly subject to external control. It follows that, regardless of where the teacher, parent, or friend places an item on the continuum of meaningfulness, the learner may place it higher or lower. In a word, the meaningfulness of an ideational learning task at any time is relative to the person who is fitting that item into his pattern of thought and action.[3]

The Anomalous Character of "Facts"

The relativity of meaningfulness in ideational learning is well illustrated in the case of many so-called "facts" which have to be learned. In recent educational literature "facts" have often been relegated to a low position in the hierarchy of educational objectives; but "facts" have fallen into such disesteem because their true psychological nature has been misunderstood. They have been thought of as essentially arbitrary associations which need only to be memorized.

To the adult "$2 + 2 = 4$" is a "fact" in the sense just mentioned. So is "Water flows downhill, not uphill." The adult uses these "facts" and countless others without being aware of the wealth of meaning they possess for him. As was pointed out above, "two" is an idea which, properly learned, belongs well to the right on the scale of meaningfulness. How much more, then, does "$2 + 2 = 4$" belong near N, involving as it does, not only the idea "two," but the idea "four," an understanding of the nature of addition and an understanding of the equivalence (shown by "$=$") of "$2 + 2$" on the one hand

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[3] J. B. Stroud, *Psychology in Education*, pp. 497-99. New York: Longmans, Green & Co., 1946.

and of "4" on the other. "$2 + 2 = 4$" is not a "fact" in the popular meaning of that term; and it is not to be memorized outright. Instead, it is a generalization and must be learned accordingly.

Likewise, "Water flows downhill, not uphill" is a generalization. Were an adult asked to explain the statement, he would immediately disclose the many meanings and relationships which are included (but hidden) in the expression which he now so easily repeats. But since he is unlikely to make this analysis, he is inclined to overlook the existence of this content and to dismiss the statement as just another "fact" which anyone can and should "get" in a moment or two.

Any generalization, *any* relationship, once it is understood, can properly be stated in a simple sentence; but the final formulation of the generalization or relationship does not rid it of meaning.[4] The formulation merely conceals the meaning. Failure to understand the nature of "facts" leads to much poor teaching in school and out. All too commonly we accept imperfect learning on the part of those who master only the language in which "facts" are expressed without having first engaged in the experiences which alone can make the "facts" vital and functional parts of their knowledge.

The Purpose and the Outline of the Chapter

The rest of this chapter will deal with the course of learning all kinds of ideational material and with methods of teaching such materials. The various types of ideational learning tasks, or of ideational material, will be roughly classified and discussed under three heads. There will be no separate section on the acquisition of information or "facts" because of the ambiguity, already mentioned, which attaches to these terms. The ensuing section will be devoted to the mastery of arbitrary associations, materials well to the left on the continuum of meaningfulness. The next section will treat the acquisition of concepts or ideas. The third section will have to do with the learning of generalizations, including laws, relationships, and principles. The final section of the chapter will be given to a discussion of the relationship between language and conceptualization, the process by which meanings are associated with objects and with verbal symbols.

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[4] The problem of the precise nature of meaning, in spite of valiant attempts to solve it, still remains with us. The best we seem able to do is to talk about it as practically as may be. Horn has done this admirably in his chapter, "Language and Meaning," in an earlier yearbook of this Society. (*The Psychology of Learning*, pp. 377-413. Forty-first Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1942.) Psychologists, philosophers, sociologists, and semanticists have wrestled with the problem of meaning, but usually in terms which are not too useful to the educationist. The most recent attack from the standpoint of semantics (or "semiotics," to use his term) has been made by Morris. (Charles W. Morris, *Signs, Language, and Behavior*. New York: Prentice-Hall, Inc., 1946.) Only those equipped with the technical psychological vocabularies of Hull and Tolman are advised to consult this volume.

THE MASTERY OF ARBITRARY ASSOCIATIONS

The Prevalence of Arbitrary Associations in Education

Ideational materials of the kind here designated as arbitrary associations are to be found at all age and educational levels. They are not confined to the primary grades, or to the earlier years, as is sometimes thought. Several examples of arbitrary associations have already been supplied. Others are: In the primary grades, "book" is the printed symbol for a word already very familiar, and "—" is a sign which stands for "take away" (subtract); in the intermediate grades, "peninsula" is the name for a strip of land which juts out into a large body of water, and "Charlemagne" is the name of a certain European emperor; in the higher grades, "pi" means 3.1416, and the verb "to appear" is "intransitive"; in the high school, "Sb" is the chemical symbol for antimony, and "hypotenuse" is the name for the side of a right triangle which is opposite the right angle. In out-of-school life, arbitrary associations are no less numerous. A yellow traffic light means "caution"; this play implement is a "bat"; the place where we keep money is a "bank."

The Conventional Account of Learning in the Case of Arbitrary Associations

Customarily we say that learning tasks like those just described are meaningless. Objectively considered, as it were, they do seem to be devoid of meaning. Why, for example, should "book" be the printed symbol for the word? Certainly the printed word does not resemble the object, nor need it be pronounced "book," save for reasons which are entirely arbitrary. And why should "Sb" be the chemical symbol for antimony? "An" would make more sense; but no, the symbol is "Sb."

The criteria by which we evaluate success in learning in the case of arbitrary associations are usually two in number: (*a*) The responses must be correct, and (*b*) they must be quickly available. Responses of this kind are achieved, it is believed, through repetitive practice. That is to say, the learner merely says, thinks, or writes the parts to be associated over and over and over again without change of any kind, except in the direction of greater speed and greater accuracy. In a word, he learns by rote memorization. Moreover, motivation for the learning has to be through external and at times remote rewards, since there is little that is stimulating or attractive in the learning experience itself and since the learning contributes little in the way of immediate values.

A Critique of the Conventional Account of Learning

The account of learning outlined in the foregoing paragraph is the natural consequence of thinking of arbitrary associations in what have been denoted "objective" terms. But learning is not likely to be correctly understood when learning tasks are viewed "objectively," for learning is a peculiarly subjective matter. It is, therefore, dangerous to build up a conception of the *learning process* by inferring the process from the *products* of learning.

The truth and the significance of this last statement will be better appreciated if the reader will engage in a simple experiment. It is suggested that he read no more of this text until after he has spent two or three minutes in learning the list of nonsense syllables (or in establishing arbitrary associations among these syllables) in the box at the right.

VUG
JEN
KIB
FOM
ZUR
TAL
DIX
WAP
HEV
XOS

Now, on the assumption that he has worked two or three minutes on the list, let the reader ask himself the following questions. They pertain, not to the *products* of learning (which are the syllables themselves), but to the *process* by which he masters them.

(*a*) Did you find some syllables relatively easy to master? If so, which ones; and why were they easy?
(*b*) Did you recognize in some of the syllables or in groups of syllables older relationships or associations that were helpful?
(*c*) Did you formulate a more or less meaningful sequence among the syllables, a sequence based perhaps upon sound or upon rhythm?
(*d*) Or, did you attempt to master the list without using any kind of relationship, in the manner commonly supposed to obtain in the case of such meaningless verbal materials?

In all likelihood, if the reader is at all capable of recalling and analyzing his processes, he will have in his answers to questions (*a*)-(*c*) a number of clues to account for his success in learning. On the other hand, the likelihood of an answer of "Yes" to question (*d*) is small. The truth is that rarely, even in the case of the most meaningless learning tasks, do we learn by brute memorization. Much more typically we impose some kind of organization upon ideational materials. The organization may be quite artificial; nevertheless, it provides a system by which to put some sort of meaning into otherwise senseless learning tasks. The method of learning, then, is not ordinarily that of changeless repetition. We do not say or think over and over again exactly what we said or thought upon first being confronted by the learning task. Rather, in successive trials we search for relationships, and our responses undergo reorganization as we approach mastery.[5]

Application to the School Situation

The tendency to organize learning tasks even when they are apparently ("objectively") meaningless has been illustrated in the case of the adult. The same tendency is to be observed when the learner is the school pupil. Note the word "tendency." There is no denying that some children habitually memorize not only when they deal with arbitrary associations but also when they deal with learning tasks which should be rich in meaning. Nor is there any denying of the fact that all children must memorize at times. Nevertheless, the tendency to organize learning tasks is a reality among school children; and, in general, the more the tendency is exercised, the easier the learning, the longer it persists, and the more functional it proves to be.[6]

"Charlemagne" as the name of an emperor is more readily learned when the child discovers (or is told) that the word really means "Charles the Great" ("magne" from the Latin "magnus"). The grammatical terms "subject" and "intransitive" need not be wholly senseless, for their meanings in grammar may be tied up with their meanings in other relationships. "Peninsula" may be recognized by a child as a long word which suggests by its appearance the shape of a piece of land that juts out into the ocean. The number system may be learned in relation to a spatial pattern or in relation to colors. Many new words may be mastered by comparing them with other words and by fitting them into verbal knowledge already acquired, in terms of sound, appearance, spelling, familiar beginning or ending, and the like, in addition to their reference to particular things or events or relationships.

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[5] McGeoch has summarized the psychological research on the learning of materials which, like those here called arbitrary associations, are relatively devoid of meaning. His brief statement concerning processes employed with such materials agrees completely with the description above. John A. McGeoch, *The Psychology of Human Learning*, p. 166. New York: Longmans, Green & Co., 1942. See also R. M. Ogden, *Psychology and Education*, p. 199. New York: Harcourt, Brace & Co., 1926.

[6] Commenting upon the meaningfulness of materials as a factor in learning, Stroud says, "Material high in associative value is for that reason comparatively easy to learn and for the same reason is easily recalled, relearned, or recognized afterward. Logical material, material capable of meaningful organization or reduction to some kind of system, comes within the operations of transfer of training, operations that facilitate recall as well as learning." (Stroud, *op. cit.*, p. 538.)

Implications for Teaching

What has been said thus far in this section may be summarized as follows. At all age and school levels there are many instances of ideational learning which require the establishment of relatively arbitrary associations. It has often been assumed that the only way to master such materials is by rote memorization. This assumption as to the nature of the learning process is an inference from the "objective" interpretation of the tasks to be accomplished; but it overlooks the *subjective* character of the learning process. An examination of the behavior of both adults and children reveals frequently the attempt to invest apparently meaningless verbal associations with meaning, no matter how artificial. When learning tasks, otherwise meaningless, are reorganized, they cease to be wholly arbitrary, and learning may be facilitated. These facts—and they are facts—have certain implications for the teaching of arbitrary associations.

(*a*) *Limitations Imposed by Common Sense.* The first implication for teaching is, in a sense, negative. The extended comment on the way in which children sometimes learn largely senseless material may be misleading. It will mislead if it encourages the belief that nothing need ever be memorized. Such is not at all the case. There is no necessity—even were there the time—for the teacher or parent to rationalize or surround with meaning every ideational learning task. The instances in which he should provide such help must be left to his good judgment.

(*b*) *Repetitive Practice.* The second implication is the counterpart of the first. The fundamental method of *teaching* some factual material, most symbols, and arbitrary associations in general remains, as always, the administration of repetitive practice. This statement holds regardless of the way in which children *learn* these materials. To a very large extent children work out their own systems of organization and find their own helps in learning. Accordingly, the teacher does not find it necessary, nor should he often try, to teach or to emphasize any particular scheme of organization. Provision of an abundance of repetitive practice assures learners opportunity to discover their own learning aids (if they want them) and to develop confidence in their ability to react quickly and accurately upon demand. Children ought not to have to *use* a wide range of associations to recall the date of the discovery of America, even though they have employed these associations in fixing the date at the time of learning.[7]

(*c*) *Occasional Help.* A great many arbitrary associations are educational imperatives: Children *must* know them. At times children cannot learn and retain these associations so long as they are unrelated to, and unconnected with, something that can put some degree of sense into them. At such times the teacher should try to provide the needed help. But as was stated before in connection with implication (*a*), the teacher must use judgment both with respect to the occasions when he should furnish help and with respect to the kind of help he should give.

With regard to the help to be given, it must be remembered that often what is a rational explanation to the adult is not rational to the child. The adult explanation may call for a degree of sophistication, a background of understanding which the child does not have. For example, the terms "minuend" and "subtrahend" are troublesome and easily confused. Some of their difficulty could be removed if their origin were explained. The suffix "-end" in both words means, in Latin, "to be—." Hence, the "subtrahend" is the "number to be *subtra*cted," and the "minuend" is the "number to be di*min*ished." This explanation may be of use to children in the upper grades, particularly if they are interested in the derivation of words. But of what use is it to children in Grades III or IV where they first encounter the words?

On the other hand, the helps which children frequently need are exceedingly simple, at least from the adult point of view. It may be enough to point out rhythm or a similarity of sound in a series of terms: Jan*uary;* Febr*uary;* or, Septem*ber,* Octo*ber,* Novem*ber,* Decem*ber.* Again, so far as most of us know, there is no rhyme or reason about the number of days in the various months; but we must know them, nevertheless. Practically every conceivable need for this information is served if we are able to repeat the familiar jingle which starts, "Thirty days hath September, April, June, and November."

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[7] H. B. Reed, "Associative Aids: I. Their Relation to Learning, Retention, and Other Associations; II. Their Relation to Practice and the Transfer of Training," *Psychological Review,* XXV (1918), 128-55; 257-85.

(*d*) *Criteria of Mastery.* To evaluate success in mastering arbitrary associations, the basic criteria are what they have always been, namely, promptness and correctness of response. Since this kind of learning does not involve the establishment of broad patterns of meaningful relationships, checks on learning are adequate when they are limited to evidence regarding speed and accuracy.

(*e*) *The Treatment of Errors.* The teacher needs to correct errors in simple associative learning at once and usually without recourse to rational explanation. Prompt correction is necessary in order to avoid the fixation of the errors themselves. Rational explanation should be undertaken only under the conditions discussed above in connection with implication (*c*).

(*f*) *Motivation.* In mastering arbitrary associations the child is generally motivated at the outset by a goal which for him has no clear-cut or essential relationship with the content he is learning. For example, when he first encounters the words "two," "five," and "eight," the words have little meaning or usefulness to him. His motivation is external to the task itself and may arise from the desire to please his teacher, to equal or surpass other children, or to impress his father or his mother.

Whenever possible, it is, of course, preferable to have intrinsic motivation from the start. When the first motivation *must* be extrinsic, it should give way as promptly as may be to intrinsic motivation. Indeed, the change to intrinsic motivation sometimes takes place without outside encouragement. For example, the child may begin to count for extrinsic reasons; but as soon as he "catches on" to the way the number system is organized, he takes pleasure in counting the 20's, the 30's, and so on. Now the motivation is largely that of discovery and the extension of experience.

(*g*) *Maintenance.* The problem of maintenance is the problem of assuring the retention of what has been learned. Most of our knowledge about retention has been gained from psychological experimentation in which the learning materials have been of the kind here under discussion, namely, arbitrary associations. In this connection one thinks at once of the classical research of Ebbinghaus with nonsense syllables.[8] From this early work and from later investigations have come curves of retention that give little ground for optimism. Typically these curves show immediate and large drops in retention after the cessation of practice. After a relatively short period of time the curves approach the base line or even coincide with it. Everything seems to have been forgotten. If these conditions must necessarily prevail in the case of all arbitrary associations taught in the school and elsewhere, the outlook is distressing indeed.

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[8] H. Ebbinghaus, *Memory: A Contribution to Experimental Psychology.* Translated by H. A. Ruger and C. E. Bussenius. New York: Teachers College, Columbia University, 1913.

This is not the place for a critique of these experimental findings and of their interpretation. True, some parallels can be found between the experimental results of the psychological laboratory and the results obtained in education; but certainly large losses through forgetting must be prevented when the arbitrary associations are vital educationally. They can be prevented, first, by having children "overlearn" the associations; that is, by having them continue practice far beyond the requirements of the immediate situation. This method of guaranteeing retention is, as a matter of fact, commonly employed both in the school and outside; but its importance is one reason for specifying, as was done above, that an abundance of repetitive practice be provided in the teaching of arbitrary associations. The efficacy of the method is attested to by our 100 per cent retention of many forms of ideational learning. We never forget how to count, for example; but consider the amount of practice we have had in the skill![9]

Another way to insure the maintenance of arbitrary associations is to see to it that they are put to use after they have been learned. Recall keeps the items "alive." More than that, since recall never occurs in situations exactly like those of learning, use after learning has the effect of establishing new relationships; and these new relationships help to combat forgetting.

THE ACQUISITION OF CONCEPTS

The technical difficulties involved in teaching arbitrary associations are neither numerous nor serious. On this account, the preceding discussion may seem to be much too long. And it would be too long, did not the discussion serve two extra purposes. (*a*) It provides a background of contrast for what is to be said about the acquisition of concepts and generalizations. (*b*) It affords opportunity to introduce ideas which can be used with profit in the remainder of the chapter. Prominent among these ideas are: the distinction between the *process* of learning and the *products* of learning, the normal tendency of the learner to organize (structure) his task as a means of facilitating learning, and the direct dependence of meaning upon relevant experiential backgrounds.

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[9] N. B. Cuff, *The Relation of Overlearning to Retention* (Contributions to Education, No. 43. Nashville, Tennessee: George Peabody College for Teachers, 1927); W. F. C. Krueger, "Further Studies in Overlearning," *Journal of Experimental Psychology*, XIII (1930), 152-63.

The Prevalence of Concepts in Life and in School

No one knows how many concepts are taught in the school. Their total is, however, very large indeed. As a matter of fact, their number is in all probability much too large, in the sense that, taken together, they comprise a learning load that is far beyond the capacity of school children to master successfully. This condition as it exists in the social studies has been unmistakably demonstrated by Horn[10] and his students. Their argument is that the number of concepts to be taught must be reduced through the elimination of the less essential ones, in order to assure sound learning in the case of the concepts that are retained.[11]

There must be a reason why we are usually insensitive to the largeness of the number of concepts in the school curriculum; and there is a reason. We tend to oversimplify the psychological nature of concepts and, thus, to minimize the difficulties they present for learning.

This matter will be elaborated and criticized very shortly. It must suffice here to give a few examples of the many concepts which occur in the school curriculum: nation, government, constitution, senator, mayor, citizen (social studies); law, element, magnet, reagent, cell, osmosis, acid, mass (science); latitude, erosion, product, region, promontory (geography); sentence, tense, voice, number, capitalization, paragraph (language arts); multiply, difference, fraction, ratio (arithmetic); scale, pitch, minor, melody (music).

If the implication of the discussion thus far seems to be that concepts are learning products peculiar to the school environment, that implication is entirely erroneous. Many as are the concepts taught in the classroom, far greater is the number acquired with or without direct instruction in life outside the school. Consider the following few samples: legal right, philanthropy, prohibition, corporation, civic duty, ordinance, the church, communism, Republican, business, sportsmanship, the United Nations, judge; and consider also the countless concepts implicit in such adjectives as: good, brave, trustworthy, unsocial, sympathetic, humane, tricky, friendly, suspicious, garrulous, white, round, square, long, heavy, valuable, and so on and on.

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[10] Ernest Horn, *Methods of Instruction in the Social Studies*, p. 523. New York: Charles Scribner's Sons, 1937.

[11] For another study of the same import, see: C. M. Brown, "A Study of Prerequisite Sciences and Certain Courses at the University of Minnesota." University of Minnesota Committee on Educational Research, 1941.

Conventional Notions Concerning the Learning and Teaching of Concepts

It is not unusual to view new concepts (when they are noted at all) merely as new "words." These "words" appear in reading matter and need to be taught to the point of recognition if the reading matter is to be of any use. Considered in this way, concepts are little more than arbitrary associations, and they are to be mastered as such, largely through memorization. Teaching consists in defining the new concepts, giving an illustration or two, and having the pupil repeat the definitions and use the new terms in appropriate situations, too often the very situations in which they first occur.

What a Concept Is

A concept is far more than a "word," far more than an arbitrary association as this term was discussed in the preceding section. A concept is an abstraction. The concept "river" is appropriately applied to a given object, but it is not properly restricted to that one object. Rather, "river" applies to a class or group of objects which have certain qualities in common. Hence, the child who uses "river" only in connection with a single particular object has no concept of "river"; or at least his concept is too incomplete to be of much value.[12]

As a matter of fact, concepts as abstractions may relate to nothing which is immediately and directly available to sense. "Charity," for example, is not to be observed as such in the behavior of people. Rather, it is an intangible quality. It is a deduction, an inference, from many instances of behavior which are analyzed and compared with respect to a special kind of purpose or of consequence. The average child can learn to recognize the *word* "charity" in reading and in conversation at age seven or eight; but he will not have much of a *concept* of "charity" for another four or five years. It takes time—more than that, it takes time filled with appropriate experiences—to acquire the concept "charity." Considerations of this sort were responsible at an earlier point in this chapter for placing concepts well toward N on the continuum of meaningfulness.

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[12] The distinction made here between arbitrary associations and concepts can easily be pushed too far. The term "river" when applied to a single object may embody a wealth of associations which give it meaning and allow it, to this extent, to partake of the nature of a concept. The distinction, therefore, is not sharp and clearly defined, but it seems to be warranted by practical necessity. Arbitrary associations shade into concepts along the continuum of meaningfulness.

Concepts are complex affairs. One way to appreciate this fact is to think of concepts in geometrical terms: concepts have *dimensions.* That is to say, in their development concepts "move" along various lines of change.[13]

Some of the dimensions of conceptual development are: from concrete to abstract, from vague to clear, from inexact to definite. When development takes any of these forms, a given concept "stays" within its particular group or system of ideas, the while it undergoes changes of the kinds just mentioned. The concept, "river," for example, belongs to the system of ideas, "bodies of moving water," and it gets its first or core meaning from this class idea. But with experience, changes occur through differentiation among members of the class. Distinctions unnoted at first become important. "River" is seen to have characteristics which are peculiar to it and which separate it from other "bodies of moving water," such as "geyser," "canal." The process of learning is, as stated, one of differentiation. "River" remains within its general class (it is still a "body of moving water"); but the concept gains in clarity, specificity, and abstractness, and its meaning is increased in these senses.

Concepts in their development reveal changes with respect to other dimensions also. To mention but a few, changes occur in their implications, relationships, ramifications, transferability, and figurativeness. Thus, "river" carries with it certain implications as to terrain, certain relationships with life in its region, and so on. One may even speak figuratively of a "river of generosity" or of a "river of good will." When changes of the kinds under consideration occur, it is to be observed that concepts escape the limits of their original narrow classes or systems of ideas. "River" is no longer merely a particular member of the class "bodies of moving water"; instead, it becomes a part of other systems of ideas. The learning process in such instances is primarily one of integration or synthesis. The learner discovers common qualities of the concept in objects or events which were not in its class to begin with, and he extends use of the concept into new relationships.[14]

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[13] Eskridge demonstrated this fact very well in his study of development in the case of geographical terms. He found that, from Grade IV to Grade VII, changes occur through: (*a*) increase in the number of meanings associated with given terms; (*b*) increase in general information about terms; (*c*) a substitution of basic for associated meanings; (*d*) a development of comprehensive meanings, and (*e*) a reduction of errors. (T. J. Eskridge, Jr., *Growth in Understanding of Geographic Terms in Grades IV to VII.* Duke University Research Studies in Education, No. 4. Durham, North Carolina: Duke University Press, 1939.)

Probably most concepts in the course of their development take on many of the kinds of change just discussed. For example, "denominator" has a definite arithmetical meaning: It is the number in an abstract fraction which tells into how many equal parts another number is divided, and so, the relative size of the parts. On the other hand, "denominator" has broader significance as well when it is transferred to nonarithmetical situations. Thus, money may be said to be the "denominator" in financial transactions. Note that in the first instance the term draws its specific meaning from a particular area of subject matter, and its "referents" are found in a special system of mathematical ideas. In the second instance, however, the term has more general usage, and its "referents" are scattered, outside the original area of mathematics.[15]

Nor have the complications of concepts yet been fully explored. Many concepts have emotional weighting (e.g., the idea of "my country"); and they may have motor aspects as well (e.g., the idea of "ax," which is not accurate or complete unless one has handled an ax). (Because of their pertinence at this point the chapters on motor learning and on emotional learning may well be consulted.)

As objectives of both formal and informal instruction, concepts are of infinite variety in their dimensions, in their emotional tones, and in their motor components. Some concepts, those regarded as educational essentials, must be carried far in their development and must finally be in the possession of all learners. On the other hand, some concepts, not of crucial educational importance, need not be taught to such limits nor to all children to the same extent.

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[14] A valuable distinction between "meaning" and "significance" as applied to concepts and generalizations has been suggested by Buckingham and others. [See, for example, Burdette R. Buckingham, "Significance, Meaning, Insight—These Three," *Mathematics Teacher,* XXXI (January, 1938), 24-30.] "Meaning," in the restricted sense of this article, inheres *within* the class or system of which the concept is a part. Thus, the "meaning" of the automobile gear apparatus is to be found only by studying the parts separately and together, within the appropriate system of mechanical principles. Contrariwise, "significance" derives from the *external* relations of the concept in question. Thus, the "significance" of the gear apparatus comes from using the apparatus, learning when to use it, what to do with it, and what the consequences of its use are. In general, the forms of conceptual development discussed in the paragraph to which this footnote is attached relate to "significance," while the forms of development in the preceding paragraph relate to "meaning." Commonly, of course, and properly so, our concepts include both meaning and significance. Indeed, it would be difficult, even were it desirable, to carry meaning in the restricted sense very far, without instilling some degree of significance—significance for *something.*

[15] C. K. Ogden and I. A. Richards, *The Meaning of Meaning,* p. 113. New York: Harcourt, Brace & Co., 1927.

Moreover, since concepts are the results of continuous changes with experience, each may be expected at different times in its development to be at different points on the continuum of meaningfulness. At the start, a given concept may be well toward the 0-end of the scale; but with more learning it will move by successive stages to the right on the scale. Regardless of its place on the scale, the *adequacy* of the concept is to be judged in the light of the needs and purposes of the learner at the time. Some concepts, as noted above, may never get beyond the midpoint on the scale and may still be adequate.

The Course of Learning in the Case of Concepts

From what has been said about the nature of concepts it is obvious that the learning of concepts is no simple matter, to be negotiated instantly, once for all, at one jump, as it were. For these reasons the typical curves produced by investigations of concept formation are not particularly helpful. To secure these curves it is usually necessary to set arbitrary standards of "rightness" for concepts and to score attempts accordingly as "correct" or "incorrect." These curves show little more than the increasing numbers of children who "have" the concept as the investigator tests from grade to grade.

Such curves and such measures may be said to be product curves and product measures. They have little to do (except very indirectly) with the learning process. Yet, if teachers are to understand and to be able to direct their pupils in acquiring concepts, what they must have is accurate knowledge of the way in which children acquire concepts. For this reason we shall find it useful to return to the idea of learning as a process of reorganization (pages 99-104) and to represent the course of learning by a schema unlike the traditional learning curves to be found in texts.

The diagram or schema below is constructed to show learning as progression in reorganization. The responses made at the beginning, at (*a*), are crude, clumsy, uneconomical, inexpert, inexact, undifferentiated, and lacking in meaning. The responses made in the end, at (*f*), are refined, neat, expert, economical, precise, and full of meaning.[16]

Learning proceeds step-wise, from level to level. Progress may be halted temporarily or permanently at any level—at any level which, as explained above, satisfies the learner's needs and purposes. Advance to a higher level is dependent, first, upon new or more intense motivation, and, second, upon the discovery of a better or more adequate way of responding. In abandoning one level of response for the next higher, the learner does not eliminate the older responses. They remain available (hence, the dotted lines in the schema) and may be called into use if necessary.

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[16] In the accompanying schema, the vertical axis is intended to represent improvement with experience, levels (*a*) to (*f*) standing for successively more mature types of performance (process). The horizontal axis, on the other hand, denotes the passage of time.

The schema is, of course, an abstraction. An illustration from arithmetic may help to explain it. Several children, say in Grade II or III, are asked, "How many are 3 and 5?" Having given their answers (their products), the children are asked to tell how they obtained them (their processes). Possibilities are:

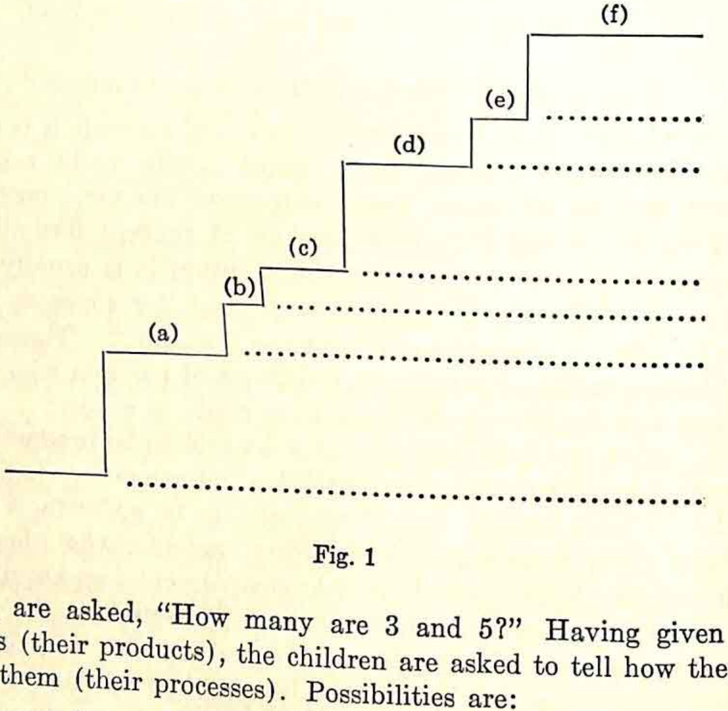

Fig. 1

(1) "I counted on my fingers, one by one."
(2) "I made three little marks; then five little marks; then counted them together, one by one."
(3) "I guessed."
(4) "I just knew." (Further questioning may reveal an absence of real meaning; the child merely recalled an arbitrary association.)
(5) "I counted to myself (mentally): 5, 6, 7, 8."
(6) "3 and 5 are the same as 4 and 4; and 4 and 4 are 8; so, 3 and 5 are 8."
(7) "I thought of 3 + 3, and added 2."
(8) "I just knew." (Questioning this time reveals that the child can "prove"

his answer in several ways. His response may be called the use of a meaningful habituation.)

It is at once obvious that processes (1) to (8) are not all at the same level of maturity and meaningfulness. Processes (3) and (4) probably do not belong on the schema at all, for they represent wholly undesirable forms of response. Processes (1) and (2) belong perhaps at step (*a*) on the schema. They are mathematically sound procedures, entirely satisfactory in initial stages of learning where, indeed, they may be essential. (Many a child "fixates" at this level overlong, as arithmetic teachers know; and then these responses become immature and undesirable.) Process (5) belongs perhaps at step (*b*) or (*c*), for it is a more mature, economical, and abstract process than is either (1) or (2). Above process (5) are processes (6) and (7), perhaps at steps (*d*) or (*e*). At the top of the schema, at (*f*), is process (8), meaningful habituation. It is the level of response to which instruction should be directed.

Research in arithmetic[17] has shown that children cannot attain level (*f*) all at once. Premature insistence upon performance at this level must produce one or another of several predictable results. (*a*) The child may refuse to learn, by becoming hopeless or by becoming indifferent or hostile to the learning task. (*b*) He may try to do what the teacher seems to want him to do, namely, to give a response (preferably the "right one"), but to give it quickly. In this case he guesses or memorizes. (*c*) The child may actually stay at the level he has reached (say, counting mentally) and become very proficient in it, so proficient that he deceives the teacher.

Sound learning is possible only as the child is encouraged to get his answer for $3 + 5$ at first by whatever method makes sense to him. From then on, he should move upward through the intermediate stages until he finally reaches level (*f*). Advances to new levels of performance are to be made only as the child is ready for them (though his "readiness" may frequently have to be contrived).[18]

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[17] W. A. Brownell, *The Development of Children's Number Ideas in the Primary Grades*. Supplementary Educational Monographs, No. 35. Chicago: University of Chicago Press, 1928.

[18] Space limitations prevent both a full account of learning according to the schema and adequate recognition of all the cautions which should be kept in mind. Of the latter, perhaps two should be mentioned. (*a*) One should not expect all children to traverse exactly the same series of steps or to proceed at the same rate. (*b*) The process of reorganization is more formal in the description than it is in reality. Actually a child who is at an early step may at that time have considerable foresight of later steps, even before he adopts them.

This lengthy illustration, taken from school instruction (because this year book is addressed primarily to teachers), could be matched innumerable times from the vast amount of conceptual learning which occurs in the home and in the community. As good an example as any from the out-of-school environment to reveal the progressive reorganization which takes place in conceptual learning is the term "sex." At first the word can mean very little to the child. To the extent that it possesses meaning at all, the reference is probably purely personal and is restricted to a single aspect or two. To assume that an explanation simple enough for the child to understand really can give him a complete understanding of the concept would be foolish indeed; but no more foolish than to attempt to teach him at his time in life all that he will ever need to know about the concept. In acquiring a rich, functional concept of "sex" the child inevitably starts at level (*a*) (whatever that is), and he advances with experience as rapidly and as surely as may be in the direction of level (*f*).

The basic processes in acquiring concepts of whatever sort are those of differentiation and integration (or synthesis). Consider the differences between the child's and the adult's concept of "mother." A single individual has first to be differentiated from other people, and at this time "mother" is one particular person. Differentiation occurs through noting personal characteristics peculiar to this person and forms of behavior performed by this individual and by none other. But as the child grows older, changes occur in this person's behavior; it is no longer completely beneficent; it may include punishment. And these new experiences must be integrated with the old. Only by stages, only by differentiating among and integrating new perceptual, motor, ideational, and emotional experiences involving the one "mother" and then others, does the child advance toward the adult concept. Nor did the adult's concept remain unchanged. Almost inevitably when he himself becomes a parent, and then a grandparent, his concept of "mother" undergoes modifications.[19]

It cannot be said too often that no one can give the learner his concepts. If he is to have them at all, he must construct them out of his own experiences. Attempts to hurry the process unduly through instruction are regularly unrewarding. Consider the evidence in the form of "boners" with which every teacher is familiar; e.g., "copra is a dried snake"; "A pioneer is a person who moves father (farther) west." These errors, frequently ludicrous, are to be interpreted as instances of incomplete and imperfect learning; and they are to be dealt with accordingly (see below, "Dealing with Errors").[20]

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[19] S. I. Hayakawa, *Language in Action*, pp. 28-29. New York: Harcourt, Brace & Co., 1941.

Implications for Teaching

Number of Concepts To Be Taught. It is both impossible and undesirable to try to teach thoroughly all concepts in the school subjects. (*a*) There are too many of them. (*b*) Many concepts will be learned outside of school, and better, provided that they are essential to the child. (*c*) Moreover, some concepts are of relatively slight importance even for the purposes of formal education. If it is neither practicable nor desirable to teach all the concepts in the school program, how many fewer are the chances, and how much less would be the *wisdom* of trying to do anything of the kind for all the multitudinous concepts of daily life outside the classroom!

Pace of Instruction. Rarely should the teacher try for completeness at the time of introducing concepts. This is true even in the case of concepts that are educationally crucial. The wider implications and relationships of such concepts, and usually their exact meanings, are not learned all at once at the outset. It takes time (relevant experience) to formulate concepts. The child gains by step-wise growth in most instances.

Level Attained. Not all children should be expected to attain the highest level or the most complete degree of meaningfulness for all concepts—or, for that matter, for any given concept. Instead, the child will ordinarily stop at any level that satisfies his needs and purposes. The teacher must respect the child's needs and purposes and should not strive for higher levels of understanding without first seeing to it that the child feels a need therefor.

Teaching as Guidance. When learning involves relatively simple and personal organization, as with arbitrary associations, the learner does not require much guidance. But such is not the case with concept formation. Here teaching may be regarded as the guidance of reorganization. It is necessary for the teacher to identify the stage or level of meaning which the pupil has attained and to use this information as the basis for helping him to find and take the next step forward. Learning partakes of the nature of problem-solving. Hence, guidance and not direction is called for.

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[20] McConnell treats the psychology of learning in the case of meanings substantially as has been done above. See pp. 295-98 and all of chapter xiii, "The Development of Meanings," in: Arthur I. Gates, Arthur T. Jersild, T. R. McConnell, and Robert C. Challman, *Educational Psychology*. New York: Macmillan Co., 1948 (revised).

The Learner's Background. Let it be repeated that the child's background of experience is an important factor in learning concepts. This background involves not alone the requisite number and kinds of concepts but frequently also relevant emotional and motor experiences. Finally, direct perceptual experiences are often vital. On this account audio-visual aids, excursions, and other means of providing awareness through sense perception with the "real" world have their place in the instructional program.

Learning Activities. Obviously, learning activities must be planned with a view to the purpose they are to serve. If the purpose is to make a concept clearer and more exact, then the learning activities must be restricted to those within the body of ideas from which the concept derives its basic meaning. The concept "constitution" would be developed in the context of related social and political ideas, and it would be ruinous to use the word in its physiological sense. By the same token, if the purpose is to develop the broader significance of the term, "constitution," then the learning activities selected must take the child outside the social and political relationships and into new areas.

Varied Experiences. Fundamentally, learning experiences should be varied rather than repetitive, as for arbitrary associations. Meaning is not extended or deepened by engaging over and over again in the same experiences, as by reciting the exact words of a definition ten times. The nonsense word "gostifluven" is as truly nonsense after fifty repetitions as after two. Instead, the child needs—and the teacher should provide—an abundance of experiences differing somewhat but all related to the pattern of meaning under development.

The points made in the foregoing paragraphs may be made clearer by a more detailed illustration. Suppose that the concept in question is "element," as used in chemistry. The student may be told that iron is an element. It is easy enough for him to learn the statement and to repeat it countless times. If his experience is so restricted, however, he may readily achieve an entirely false concept, for he may seize upon some nonessential quality of iron as meaning "element,"—its heaviness, for example, or its color, or its hardness, or even its metalness. He learns then that copper is an element, as are also silver, aluminum, and gold. He will have to modify his original concept, for it does not exactly fit these additional metals. To the extent that he does so, he differentiates among the characteristics of the metals, isolating those that are common to them. Thus, color is eliminated, but hardness, metalness, and heaviness (altered somewhat) remain. If he stops at this point, he is hardly prepared for the information that oxygen and hydrogen are elements too. Further differentiation is required in view of his increase in experience, or, better, in view of the variety of his new experiences. Eventually, under guidance which enables him to "tease out" the critical aspects, he arrives at a satisfactory concept of "element." Through changes in the conditions in which the term is used, opportunity is afforded for the necessary discovery of the basic or core idea, as would not be the case if he encountered the term only in a single condition of use or in a limited number of conditions. In the end, the student has a chemical concept which he can apply at once, meaningfully and confidently, to such other elements as the liquid mercury.

But the term "element" is employed in quite different contexts, in contexts which are nonchemical. Thus, we may say that hard work is an "element" in success, that intelligence is an "element" in scholarship. Obviously, the concept must be carried outside the category of chemistry into quite dissimilar categories. The required transfer is clearly possible again only as varied experiences are provided. The core idea of "elementness" must be identified in unlike situations if its meaning is to be extended to accommodate nonchemical usages.

Space does not permit the elaboration of the illustration to cover other increases in meaning and significance of "element," e.g., the implications of the term for chemical theory. Perhaps enough has been said, however, to support the statement that varied experience, not repetitive practice, is the key to sound conceptual learning. Varied experiences furnish occasions both for further and further differentiations and for the amalgamation (integration) of the discovered meanings and applications into the concept of "element" which is the mark of an educated person.

Dealing with Errors. Errors in the course of concept formation provide fruitful opportunities for constructive teaching. In teaching concepts we have adhered too closely to the traditional dictum, "Never expose a child to error." According to this dictum errors are unfortunate events, to be forestalled at all costs and, if they occur in spite of us, to be passed over and "corrected" as quickly as possible. However valid the dictum for the teaching of arbitrary associations, it is completely false for the teaching of concepts. Errors in the use of concepts imply incomplete and distorted learning. It accomplishes next to nothing to "correct" them by substituting the proper term or by employing any other device so simple. Errors cannot possibly be avoided, and it is good sense to deal with them effectively when they occur. Children need to know not only what concepts *are* (what they include, to what they refer) but also what they are *not*. The time it takes to clear up misunderstanding is amply repaid.

Criteria. In the evaluation of conceptual learning, the basic tests are no longer simply speed and accuracy, as in the case of arbitrary associations. Here the test is the ability to *use* the concept correctly. Here, too, accuracy involves correct relationships in language situations of a complicated character. And here, too, all that has been said about levels of meaning is pertinent.

Indeed, in the case of conceptual learning, measures of rate and accuracy of performance are frequently imperfect and, many times, misleading indexes of status. Note that the child who counts on his fingers to get the answer for $3 + 5$ may outscore in speed and in accuracy the child who has just arrived at a higher level, where he "solves" the combination abstractly through the use of more familiar combinations. The latter child may operate more slowly than the former and may make more mistakes; but he is, nevertheless, further along in the essential aspects of conceptual learning.

Motivation. Intrinsic motivation is always preferable to extrinsic motivation. Fortunately, intrinsic motivation is much more possible of realization in the case of conceptual learning than it is in the case of arbitrary associations. As he develops a meaningful system, the child becomes more desirous of further learning.

At times initial motivation must be extrinsic. Such may be the situation when the concepts in question are those which society insists upon being learned. The situation is similar, too, when the child has "fixated" his development at an undesirably low level. In such cases the problem is one of instilling in the child dissatisfaction with his status; and the best method of securing this condition is to convince the child of the inadequacy of his status by creating the feeling of a new need or purpose.

Maintenance. The maintenance of concepts presents few serious problems if the learning is truly functional, that is, related to the child's needs and purposes. There will automatically be some overlearning. Moreover, support for concepts will be given by all the interrelationships which are established within the system of which the concept is a part, together with the relationships set up with other systems of concepts. There is, however, no justification for trusting entirely to chance. The best insurance of retention is to provide opportunities for use in significant activities.

As a matter of fact, the term "maintenance" is of doubtful usefulness when applied to conceptual development, for it implies merely the preservation of a status already achieved. Preservation of status is not enough. Rather, what should be sought through teaching, at least in the case of essential concepts, is steady progress toward greater fullness of meaning. For this reason, it becomes all the more important that concepts be employed over and over again, not alone in their first contexts but in an ever widening variety of new contexts.

The Acquisition of Generalizations

All that has been said about the acquisition of concepts applies to the acquisition of generalizations. Like concepts, generalizations, when they are learned as they should be learned, are located well toward the N-extreme of the continuum of meaningfulness.

What a Generalization Is

As the term "generalization" is to be used here, it refers to any verbalized formulation of a relationship which is of broad applicability. Hence, it includes principles, laws, and rules. It may also include such terms as definitions, propositions, hypotheses, mottoes, inferences, conclusions, as well as other less ambitious formulations. The word "may" must appear in the preceding sentence because of the requirement that expressions of relationships be of relatively wide reference if they are to be accepted as generalizations. Thus, the statement, "This man is an Austrian," expresses a relationship, but it is not a generalization for the reason just mentioned.[21]

Psychological terminology in this area of the "higher mental processes," to use Judd's phrase,[22] is far from settled. Attempts have been made to distinguish among generalizations, rules, laws, principles, and other expressions of relationship; but the attempts have been uniformly futile. There are no criteria for differentiating consistently and clearly among the terms, though satisfactory distinctions are sometimes possible between pairs of terms (e.g., principles and laws; hypotheses and laws). In any case the distinctions are logical rather than psychological, for the learning process is for all practical purposes the same, regardless of the particular name given the product. Therefore, it seems sensible to regard "generalization" as the generic word.

Any generalization states some abstract relationship among two or more concepts. The simple generalization, "All horses are animals," is understandable and functional only if one has adequate concepts of "horses" and "animals," to say nothing of the concept of partial equivalence which is represented in the word "are." Based as they are upon concepts, generalizations are more complicated than is any one of the component concepts. An added complication is introduced by the fact of the relationship which is established. For these reasons, generalizations may be viewed as the final achievements, the capstones, as it were, of conceptual learning. And, accordingly, they are the most difficult of all mental constructs to attain.[23]

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[21] The definition of "generalization" proposed for this chapter is open to objection, and for reasons which are recognized in the paragraphs above. Obviously, it could be argued that the very statement cited as a nongeneralization, "This man is an Austrian," is actually a generalization. The sentence contains the terms "man" and "Austrian." These words stand for concepts; and as such they represent generalizations.

[22] Charles H. Judd and Others, *Education as Cultivation of the Higher Mental Processes*. New York: Macmillan Co., 1936.

The Prevalence of Generalizations in Education

The number of generalizations taught in the course of school education is certainly very large, unquestionably much larger than is commonly recognized. They abound in all the so-called content subjects and also in certain subjects, such as arithmetic, which are not always so classified. A few sample generalizations are:

Language Arts: The first word of every sentence should be capitalized.
Every paragraph should be constructed around a single main idea.
Geography: The natural environment provided by geographic regions has marked influence upon the distribution of population.
Features of the physical environment are important factors in determining the structural form of life and plant and animal habits.
Science: The evolution of the earth has come about through the operation of natural forces.
All life comes from life and produces its own kind of life.
Arithmetic: The sum of a given group of addends is unaffected by their order.
The value of a fraction remains the same when both numerator and denominator are multiplied by the same number.
Geometry: The sum of the angles of a triangle is 180 degrees.
If two sides of a quadrilateral are equal and parallel, the figure is a parallelogram.
Social Studies: In a democracy every citizen is entitled to freedom of worship.
Arid areas tend to have few people per square mile.
Fine Arts: In drawing, near objects are made larger than distant objects.
In a song the melody should be consonant with the spirit of the words.

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[23] Two early analyses of the process of generalization are presented in: H. A. Ruger, "The Psychology of Efficiency," *Archives of Psychology*, II, No. 15, (1910); J. C. Peterson, "The Higher Mental Processes in Learning," *Psychological Monographs*, XXVIII, No. 7; Whole No. 729, (1920).

Life outside of school, likewise, abounds in generalizations, of which the following are suggestive:

One should win with modesty.
Stocks for which extremely high returns are promised are usually unsafe for investment.
A good newspaper is a community asset.
Children should heed their parents' advice.
"To err is human; to forgive, divine."
Automobiles should not be parked in front of fire hydrants.
If we borrow money, we should repay it promptly.
One must take his turn in games.
We must respect the property rights of others.
Unnecessary tardiness is blameworthy.

The Learning of Generalizations

Generalizations are products of problem-solving.[24] Not all problem-solving leads to generalizations, but generalizations are attainable in no other way. They certainly are not attainable by memorizing the formal sequences of words in which generalizations are usually couched, as might be deduced from certain erroneous practices in teaching. Many a high-school student who cannot differentiate between sentences and nonsentences can produce an acceptable definition of "sentence." His inability to identify and to write good sentences can scarcely be attributed to neglect of the definition. On the contrary, in all probability he has learned and relearned the definition in a half-dozen successive grades. His inability, rather, is to be attributed to the wrong kind of learning and of teaching.

Since the psychology and the pedagogy of problem-solving are treated in chapter viii of this yearbook, there is no point in duplicating that discussion. Still, it may be permissible to make three observations. (*a*) Obviously enough, problem-solving is initiated by the existence of a problem. (*b*) Success in problem-solving is dependent upon one's having the requisite background of arbitrary associations, concepts, factual knowledge, and pertinent generalizations. (*c*) Success is also dependent upon one's having an effective procedure or method of attack. Lack of (*a*) means that one will not even get started. Lack of (*b*) and (*c*) means that, even if motivated by a problem, one can attain the solution only by accident.

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[24] Here again is a statement which, for convenience, is made more emphatic and positive than the facts warrant. It is not intended here to imply that the techniques of problem-solving are to be used in the acquisition of generalizations only, any more than in an earlier place it was intended to imply that differentiation and integration are restricted in their usefulness to the acquisition of concepts. The latter processes are obviously necessary in acquiring generalizations; and, commonly, the learner should adopt the problem-solving attitude in acquiring concepts. The purpose of the statement above is to stress the greater complexity of the learning process in the case of generalizations, to accord with the greater complexity of generalizations as compared with concepts as learning outcomes.

Consider the case of the typical geometry student who is called upon to learn the proposition (generalization), "The sum of the angles of a triangle is 180 degrees." (*a*) How often is he motivated to learn the proposition through curiosity about the geometric relationships involved? These relationships, all too frequently, present no "problem" to him. He may be motivated to learn, but the motivation has little to do with geometry as geometry. His "problem" is "to get my lesson," or "to please my teacher." So motivated, he is scarcely eager to attack as a problem in geometry the problem set him by his teacher or his textbook.

(*b*) But suppose he is interested in the geometric relationships expressed in the proposition. He may be blocked by lack of appropriate understandings. After all, angles are hard to visualize as geometric abstractions. They seem to be "set" or "fixed" in the figure (Fig. 2) with which he deals. Angle *a* is where it is, and has to stay there; so also, with angles *b* and *c*. He finds it hard to rearrange the angles and to think of them as parts of a single straight angle.

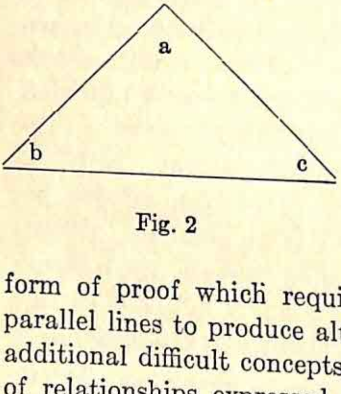

Fig. 2

(*c*) Or, he may not understand the traditional form of proof in geometry, a form of proof which requires, first, the alteration of the figure by parallel lines to produce alternate, exterior, and interior angles (some additional difficult concepts), and, second, the organization of a series of relationships expressed according to an established pattern. Not seeing any sense in this pattern, many students try to memorize their way through geometry. This tendency can be kept in check by good teaching. Good teaching requires that both the individual steps and their sequence be made units of meaningful learning.

Implications for Teaching

The Number of Generalizations To Be Taught. It is impossible to teach in school all the generalizations that may be needed in life. Likewise, it is impossible, and unnecessary as well, to teach all the generalizations selected for the school curriculum to the same degree of thoroughness. Judgment must, therefore, be exercised both in choosing generalizations for school instruction and in deciding how completely to teach those that are chosen. Similar statements hold in the case of the innumerable generalizations which one inevitably encounters in life in the community.

Guidance in Problem-solving. Since the fundamental learning process in acquiring generalizations is that of problem-solving, the teaching of generalizations consists in guidance in problem-solving, with all that that statement implies.

Motivation. Motivation is a basic condition in all learning, including the acquisition of generalizations. In the latter case, motivation is provided by awareness of a problem. It has been said above that concepts cannot be "given" to children. Neither can generalizations be "given" to children.[25] Generalizations, when presented as learning tasks by parent, teacher, or textbook, do not necessarily initiate problem-solving activities on the part of children because they may raise no problems for them. In these circumstances when generalizations are "learned," they are usually learned only as verbal formulas.

The first step in teaching generalizations, and the most difficult to manage, is to make sure that children see a problem in what is to be learned—see it, and make it their own. When this precaution has been taken, children are intrinsically motivated and are "set" to deal directly with the relationships expressed in the generalization.[26]

Experiential Background. Every generalization, by definition, involves a number of concepts. It is, therefore, futile to try to teach generalizations among concepts that are not themselves full of meaning. Consider the generalization, "In a democracy every citizen is entitled to freedom of worship." What is "freedom of worship"? What is a "citizen"? If I live in a country, am I a "citizen" of that country? If not, what must I do to become a "citizen"? What is "democracy"?

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[25] An initial verbal formulation may shorten the process by which the learner arrives at his generalization. See G. Hendrickson and W. H. Schroeder, "Transfer of Training in Learning To Hit a Submerged Target," *Journal of Educational Psychology*, XXXII (1941), 205-13.

[26] As a matter of fact, when children are motivated by real problems, they are "set" to learn not merely generalizations but arbitrary associations and concepts as well. The problem supplies a frame of reference which both motivates this extra learning and establishes functional relationships that facilitate learning. It is clear from what has been said that the "problems" are by no means restricted to the traditional subject-matter approach to teaching. Herein lies much of the reason for the effectiveness of teaching through so-called "experience units."

Why do we say that we have a "democracy"? How does our country differ from countries that are not "democracies"? And what is there about a "democracy" which requires that its "citizens" enjoy "freedom of worship"? The child who cannot answer such questions cannot really acquire the generalization in question.

But it is not enough that the concepts be understood as separate intellectual constructs. Probably most citizens in the western democracies subscribe to the generalization regarding freedom of worship, but our behavior is not always consistent therewith. Our shortcomings are attributable only in part to deficiencies in the basic concepts. Probably they are more truly attributable to our failure to relate the concepts into the pattern of conduct implicit in the generalization as a whole. In teaching generalizations, therefore, we must provide all kinds of experience—perceptual, motor, ideational, and emotional—that can make them really functional parts of our learning and living.

Teaching To Think. There are those who say that it is impossible to teach children to think. If this doubt merely means that we cannot improve a general faculty of problem-solving, it is justified. The doctrine of formal discipline was long ago buried, but not the notion of transfer of training. Certainly we can help children to think more effectively in the principal areas of their experience.

There is no magic formula for teaching children to solve problems. We sometimes try to find such formulas. In school arithmetic, for example, it is common practice to give children a neat if artificial pattern of thinking as a means of solving verbal problems. Children, after reading a problem, are instructed to ask themselves and to answer in sequence the following set of questions: "What am I asked to find?" "What facts am I given?" "What numbers shall I use?" "What process (e.g., addition) shall I use?" "What is the probable answer?" Incessant drill on this kind of formal analysis has failed to produce good problem-solvers. On the other hand, some research has demonstrated that better results are to be secured when children are given plenty of verbal problems and are left to their own devices.

The efficacy of this latter program seems to lie in the fact that some children may eventually formulate their own methods of attack. And indeed some children will; namely, those who have an adequate fund of meanings and who, in the course of dealing with many problem situations, learn to "see" these meanings and to use them in solving problems.

It may well be that, in general, in and out of school, we have worked in the wrong places when we have worked at all on the improvement of problem-solving (thinking). Perhaps we might be more successful if we made sure that children had the requisite understandings and then allowed them to devise their own methods of attack. In the absence of convincing research data, this statement can be no more than a hypothesis. However, even if the hypothesis should be established as sound, there would still be occasions for helping some children to improve their methods of attack and for helping other children to find methods. There would also be the necessity of teaching children the special characteristics of some types of thinking, as, for example, in geometry. When the child needs help in improving his ability in problem-solving, regardless of the nature of his deficiency, he should have it. Chapter viii contains suggestions for teaching in such instances.

Deductive versus Inductive Teaching. Should we present generalizations at once and then supply illustrations and applications, or should we let generalizations emerge as the natural consequences of directed experience? So stated, the questions are made to pose a dichotomy; and we are made to face an either-or proposition. Like other dichotomies, this particular one is pointless in all kinds of education. (*a*) The commonly made statement that induction is *the* method of science (and hence must be taught in science courses if nowhere else) is fallacious. Scientists employ both methods, and probably as many insights have come deductively as have come inductively. (*b*) While a good theoretical argument might be advanced for exclusively inductive teaching, it must be conceded that this approach is time-consuming; and we are usually pressed for time, in school especially. (*c*) The truth is that we must be able to think both deductively and inductively, and both types of thinking need to be developed. (*d*) In the end, the important thing is that the generalizations taught (at least those that are essential in life) be full of meaning and susceptible to functional use. If this condition is met, it probably makes little difference whether they have been acquired deductively or inductively.

Learning Experiences. Like concepts, generalizations are best learned through varied experience rather than through repetitive practice. When learned in connection with a single situation, generalizations are not actually generalizations at all. They are merely expressions of relationships which hold for a given set of particular conditions. Hence, it is essential that children have a wide range of experiences pertinent to each given generalization. Situations which involve the generalization should be analyzed to note its presence and its operation. Other situations are needed to provide opportunities to apply and use what has been learned.

No child should be permitted from a single laboratory observation to formulate the generalization, "Heat tends to accelerate chemical reactions." (As a matter of fact, to base a generalization on a single experience is in itself to be "unscientific.") Instead, both in deriving the generalization and in applying it, learners need to encounter other instances of its validity; and the more practical, concrete, and natural or everyday such encounters are, the better.

Maintenance. There are no troublesome questions about the maintenance of thoroughly learned generalizations. Research[27] has shown that generalizations are the stoutest of all verbal learning products in resisting the evils of forgetting. But the phrase "thoroughly learned" is crucial in the first sentence of the paragraph. Generalizations which are but memorized sequences of ill-understood words are no better retained than are arbitrary associations. The problem of guaranteeing retention of generalizations is, therefore, first of all, the problem of sound teaching at the outset, and then the problem of providing enough subsequent opportunities for use to keep them in working order.

But, to speak frankly, we should not seek merely to "maintain" generalizations. Rather, as was stated in connection with concepts, we should take steps to insure their continuous extension and enrichment. This purpose we serve by seeing to it that generalizations are called upon to function in more and more ways, in an ever increasing number of new situations.

THE RELATIONSHIPS BETWEEN LANGUAGE AND VERBALIZATION

In this chapter the acquisition of arbitrary associations, concepts, and generalizations has been discussed largely in terms of verbal learning (but verbal learning which is accompanied by perceptual, motor, and emotional learning as well). To say the same thing in another way, the process of conceptualization has been related very closely to development in the ability to use language. Unquestionably the relation is close; but language development and conceptualization are not identical.

Nonverbal Concepts and Generalizations

Long before the young child possesses language,[28] as we know it, he gives plenty of evidence that he can and does react to "objects not present to sense" by means of nonverbal representations, probably in the form of imagery.[29] Wanting something which he does not have and which he cannot see and hear, he becomes restive. His restiveness continues so long as he is given the "wrong" objects and subsides only when he has the "right" one. As he gets older and acquires language terms, his dependence upon nonverbal clues becomes less and less, and language terms are substituted. By the time the child enters school, and steadily more so as he advances through the grades, he uses language symbols in his thinking and in his overt behavior. Nevertheless, use of nonverbal clues persists to some extent, even into adult life.

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[27] See, for example, Judd, *op. cit.*, chap. ii.

[28] Curti discusses to good effect the period of "preverbal nonsymbolic control." See: Margaret Wooster Curti, *Child Psychology*, pp. 251-58. New York: Longmans, Green & Co., 1938 (second edition).

Likewise, there are nonverbal generalizations. That is to say that children (and adults) arrive at understandings of relationships which they cannot verbalize. The truth of this statement is attested both by common observation and by research.[30] The presence of nonverbal concepts and generalizations is especially to be noted in emotional and social disturbances and disorders. Here the victim cannot identify and describe in language the origin and sometimes the nature of his difficulty. In such cases one of the principal steps in therapy is to help him to verbalize.

The Function of Language in Conceptualization

Nonverbal concepts and generalizations can be accepted as facts without depreciating in the least the vital role of language in the process of conceptualization. As Dewey points out, so far as individual meanings are concerned:

> A verbal sign (*a*) selects, detaches, a meaning from what is otherwise a vague flux or blur . . . .; (*b*) it retains, registers, stores that meaning; and (*c*) applies it, when needed, to the comprehension of other things. Combining these various functions in a mixture of metaphors, we may say that a linguistic sign is a fence, a label, and a vehicle—all in one. . . . . Words are not only names or titles of single meanings; they also form *sentences* in which meanings are organized in relation to one another. . . . . *The chief intellectual classifications that constitute the working capital of thought have been built up for us by our mother tongue.* Our very lack of explicit consciousness in using language that we are employing the intellectual systemati-

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[29] Goodenough points out evidence of the infant's use of nonverbal concepts in his use of objects as means to ends. Infants "show, by their mistakes as well as by their successes, that they are responding to ideas about objects and not to objects as such . . . . the baby gets many a bump from his attempts to use a rocking chair or other unstable objects as the highway to a cookie jar." [Florence L. Goodenough, *Development Psychology*, p. 263. New York: D. Appleton-Century Co., 1940 (second edition).]

[30] K. L. Smoke, *An Objective Study of Concept Formation.* Psychological Monograph, No. 4, 1932. See also a recent investigation: Gertrude Hendrix, "A New Clue to Transfer of Training," *Elementary School Journal*, XLVIII (December, 1947), 197-208.

zations of the race shows how thoroughly accustomed we have become to its logical distinctions and groupings.[31]

Through the agency of language we can acquire understandings about lands we shall never visit and about events that transpired long ago. Through language we can even penetrate the future and imagine and plan events that are yet to occur or that may never occur. Not only does language enable us to escape the limitations of space and time in our search for meanings and relationships but it also enables us to think with understanding about things that do not exist and cannot exist, as, for example, the abstractions of advanced mathematics. It is not without reason that language is our chief vehicle of instruction.[32]

"The Abuse of Linguistic Methods in Education" (Dewey)

What has been said in the foregoing paragraphs is intended to emphasize the extraordinary values of language in learning and in teaching. But language as a medium of instruction has its dangers also. Again to quote Dewey:

> The premium put in the schoolroom upon attainment of technical facility, upon skill in producing external results, ... often changes [the] advantage [of language] into a positive detriment. In manipulating symbols so as to recite well, to get and give correct answers, to follow prescribed formulae of analysis, the pupil's attitude becomes mechanical, rather than thoughtful; verbal memorizing is substituted for inquiry into the meaning of things.[33]

This statement is as apropos to education today as it was to the education of 1910. The danger to which Dewey alludes is the danger of verbalism. Perhaps no other weakness in school instruction respecting arbitrary associations, concepts, and generalizations is so prevalent or so serious as that which leads children to substitute memorization for meaningful learning. Indeed, perhaps the chief purpose of this chapter has been to combat this weakness, by analyzing the psychological nature of the learning products to be achieved, by showing how children attain them, and by suggesting appropriate procedures for guiding their learning activities.[34]

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[31] John Dewey, *How We Think*, pp. 173, 175. Boston: D. C. Heath & Co., 1910. This volume, first printed forty years ago and revised in 1933, still remains one of the most valuable of references on the topic discussed in this section of the chapter.

[32] S. I. Hayakawa, *op. cit.*

[33] Dewey, *op. cit.*, p. 178.

[34] Many of the problems treated in this chapter have been discussed valuably in: *Language in General Education*. Committee on the Secondary-School Curriculum of the Progressive Education Association. New York: D. Appleton-Century Co., 1940.

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CHAPTER V

HOW CHILDREN LEARN INTERESTS, MOTIVES, AND ATTITUDES

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DEVELOPMENT AND LEARNING IN THE ACQUISITION OF INTERESTS AND ATTITUDES

Interests and Attitudes as Motives

Other chapters of this yearbook concern themselves with motivation. Undoubtedly the problem of "motivation to learning" is central both to educational psychology and to schoolroom procedure. In this chapter we consider the interests and attitudes of children, and at the outset we present the notion that interests and attitudes in children are best understood when viewed as externalized expressions of motives. Hilgard and Russell, elsewhere in this yearbook, consider as a motive anything that energizes and directs conduct. Earlier writers[1] made a distinction between motives on the one hand and attitudes and interests on the other. The latter were considered as channels through which motives are expressed. Allport[2] takes the position that attitudes and interests may have motive power in their own right as well as being simply directional. Social psychologists in the last fifteen years have tended to follow Allport.

Attitude has been defined by psychologists in various ways. An attitude may be considered as a system of ideas with an emotional content. Thus, an attitude may be a belief which matters to the individual; it may be a prejudice or bias in favor of certain ideas. Considered as a belief, an attitude may or may not be relevant to known facts, but the person who holds the attitude is predisposed to think as if his belief were in line with fact.

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[1] William McDougall, *The Energies of Men* (New York: Scribners, 1933); D. D. Droba, "The Nature of Attitude," *Journal of Social Psychology*, IX (November, 1933), 444-63.

[2] Gordon W. Allport, "Attitudes," *Handbook of Social Psychology*, pp. 698-844. Edited by Carl Murchison. Worcester, Massachusetts: Clark University Press, 1935.

An attitude may also be considered as a predisposition or "set" to act in certain ways when appropriate stimuli exist. That is, we say a person has a hostile attitude toward his teacher when he displays a tendency to disobey or reject the teacher's appeals to him. This tendency may be openly displayed in many ways, or it may be rather well concealed, existing only as a tendency to rebel, perhaps displayed only through furtive glances, a clenched hand, or a muttered word.

It is logical to assume that attitude as an emotionally toned set of ideas inevitably leads to appropriate action or to a disposition to action. The child who has a strong attitude of outgoing friendliness for another child must indeed be shy and inhibited not to give frank expression to his attitude in many overtures. Even the very shy child will have many impulses to such overtures, betrayed in many ways to the sensitive observer.[3]

Psychologists have tended to follow Allport's definition of attitude as a "mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related."[4] They have, moreover, accepted Allport's position that attitudes can act as motives. One can describe an outgoing, friendly attitude as the channel through which a need for affiliation with others is expressed; it is also reasonable to assert that friendliness in its own right can possess a driving quality, producing in the individual appropriate goal behavior. For instance, the well-adjusted, socially poised "leader" seeks recognition and social fulfilment for his associates by distributing attention and reward among them in their games and play.

Psychologists, however, have favored the definition of attitude as a set of emotionally toned ideas.[5] Certainly it is easier to measure a child's attitudes by asking him to state his belief than by observing his behavior. In the typical "attitude test," the respondent is asked to vote on a series of propositions, usually graded from one extreme to another in terms of the feeling tone implied or expressed. Generally the vote is in terms of "agree" or "disagree," or in terms of intense or moderate agreement or disagreement. Usually, too, there is a neutral or "indifferent" option. Or the subject may be asked to select among a series the proposition which most nearly expresses his belief or position. Obviously, a voting technique so complicated is unsuited to young children and has rarely been used below the junior high school age levels. With young children, the so-called "projective techniques" for the study of personality are more likely to elicit attitudes than direct interviews or tests.[6, 7] Regardless of the means for measuring attitudes, the assumption is generally made that the verbal statement of belief is an adequate index to likely conduct in behavioral situations. Most, if not all, studies of attitudes explicitly or implicitly assume that such verbal expressions are true indications of how the person is likely to act in appropriate situations.

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[3] James' notion of ideo-motor action relates to this concept. See William James, *The Principles of Psychology*, Vol. II, pp. 522-28. New York: Henry Holt & Co., 1890.

[4] Allport, *op. cit.*, p. 810.

[5] See, for example, Raymond B. Cattell, "Sentiment or Attitude? The Core of a Terminology Problem in Personality Research," *Character and Personality*, IX (September, 1940), 6-17.

The classroom teacher makes many judgments about attitudes without recourse to tests. Generally he comes to his conclusions on the basis of the behavior observed—remarks, inflections of the voice, facial expressions, postures, and muscular contractions. The teacher's interpretations of such behavior will be crucial in proportion to his knowledge of the child in his total social context.

An *interest* is defined by preoccupation with an activity when the child is free to choose. We describe a child's interests by noting what objects he plays with, buys, collects, or utilizes when there can be discerned an element of spontaneity in the activity. Thus, we say a child is much interested in pioneers when we note that in his free reading time in the classroom he repeatedly seeks out books which have the pioneer as their subject. We may measure the degree of the child's interest by noting the length of time he spends with an activity in a given period, or we may describe an interest in terms of what the child tells us he enjoys doing, or what he reports doing frequently.

While a boy's intense interest in building model airplanes may serve as a channel through which a strong need for approval is expressed, it is not beyond reason to say that the interest in airplanes can be a motive in its own right, a need which can be satisfied by appropriate goal behavior, involving goal objects and influencing the

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[6] Lawrence K. Frank, "Projective Methods for the Study of Personality," *Journal of Psychology,* VIII (October, 1939), 389-413.

[7] Marian J. Radke, *The Relation of Parental Authority to Children's Behavior and Attitudes.* Child Welfare Monograph Series, No. 22. Minneapolis: University of Minnesota Press, 1946.

child's learning. Allport considers interests as dynamic and enduring attitudes of a special type, referring most generally to a class of objects rather than to a single object.[8]

THE DEVELOPMENTAL APPROACH: MATURATION AND THE DEVELOPMENT OF INTERESTS AND ATTITUDES

One of the primary characteristics of the infant human organism is its orientation toward its environment; it *attends* to stimuli from without. With maturity it responds to an ever increasing range and variety of stimuli within the biological limits of the sensory equipment. The process by which the organism comes to react selectively to the continuing and ever varied barrage of stimuli from without is known as the *learning* process. It is the organism's nature to respond; what it comes to respond to with enthusiasm, or apathy, depends upon accumulating experiences, pleasant or unpleasant, need-satisfying or unrewarding, adjustment-facilitating or hindering. Interests and attitudes are not inborn. Rather they are developed in the intricate network of contacts the child has with other persons, with his own performances, and with the environment, both natural and cultural.

Developmental psychology stresses the significance of the early years and the rapid growth and development which take place then. When a child enters the primary grades—the beginning of a rich learning experience lasting throughout a long period—he is already more than halfway along toward maturity in physical and intellectual stature as measured by growth curves.[9] In this early period of rapid growth (the preschool period), the young child shows certain behavior changes highly significant for his current and later learning. These behavior changes appear to come about independently of his immediate learning experiences and are, therefore, important determiners of the learning which occurs. Indeed, one might almost say that apart from these characteristic changes in the maturing child, learning of interests and attitudes would be impossible.

One such direction of change is increased susceptibility to secondary incentives. The very young child is more likely to occupy himself with activities which are of direct and personal significance to him, however meaningless they may appear to the observing adult. It is not until later that adults can set tasks and inspire a child's concern with them so that he develops as intense and personal a response as he does in motivation arising out of his primary needs. As the child grows older, it becomes more and more possible for others to establish activities which will command his concern—to induce motivation, as it were. It would be grossly inaccurate to speak of this as a movement from autogenous motivation toward induced motivation. It is rather a development to widened horizons of activity, in which there is more and more room for elaborated, derived motivation as well as for primary motives.

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[8] Allport, *op. cit.*, p. 808.

[9] For an exposition of this point, see Florence L. Goodenough, "The Measurement of Mental Growth in Childhood," *Manual of Child Psychology*, p. 467 f. Edited by Leonard Carmichael. New York: John Wiley & Sons, Inc., 1946.

Another trend of significance for the child's learning of attitudes and interests is his growing capacity to sustain his attention. Interests or attitudes as we understand them would be unthinkable in a person whose attention moved fleetingly from object to object, from concern to concern, as it characteristically does in the infant or very young child. Fortunately, there comes about rapidly an ability to persist in attention to objects or activities. It is commonly thought that the preschool child, or even the child of elementay-school age, has certain limits set on his powers of concentration. Yet every observant parent knows what teachers sometimes miss, that in a setting free from schedules and compulsions young children can and do spend long periods at such simple activities as building with blocks, picking out a tune on the piano, or puzzle-solving. Often the task is not one which would engage the adult for very long. Part of a child's seeming lack of concentration may well arise from the fact that the adult frequently sets tasks which are meaningful to him (the adult) but insignificant to the child and his motives at the time.

A third dimension of change which comes about with development is the increasing concern which the growing child shows for remote as opposed to immediate goal objects. The fact that the young child cannot become greatly excited over goal objects or rewards promised in the distant future has been thoroughly accepted by most educators. The capacity to delay satisfactions, to work for distant goals, is sometimes taken as one criterion of maturity. The adolescent and adult can (and should) be appealed to in terms of needs and values which may be anticipated or expected as well as in terms of immediate situations.

A fourth characteristic of developmental change relates to changing susceptibilities to dramatic, emotion-evoking stimuli. The infant very early attends to patterns of sounds and to patterns of light and shade. Human adults, as sources of sound and of moving or as changing visual stimuli, early acquire a special significance to the infant's perception. This particular interest in humans, especially adults, is reinforced by the significance of persons as sources of satisfactions and deprivations in the young child's experience. This concern with persons as sources of emotion-producing experience appears to intensify as well as to change with development into adult life. Broad patterns of changing play interests, of changing social habits and attitudes, are well described in any standard text on child psychology. For example, the child's preoccupation with dramatic play involving themes from familiar experiences gives way, in part, to the older child's interest in radio programs of excitement and violence and in the "blood and thunder" of comic books and motion pictures. This interest in turn gives way, in adolescence, to concern with more social and romantic themes. During this time, also, the young child's interest in the simple motor activities of childhood has yielded place to interest in the complex, more highly structured athletics of the teen-years.

A final characteristic of development has to do not so much with change as with *persistence*. It must be remembered that the motives which occupy so large a portion of the experience of infants and very young children—the physical needs or appetites—continue to occupy a primary position throughout life. The process of growth permits the child to absorb complex experiences and at the same time encourages the establishment of routines with respect to the satisfaction of physiological needs. For most children, the satisfaction of primary motives has been made so much a matter of habit and routine that education can give its attention almost wholly to secondary or derived motives. However, at any age, let one of the basic physiological needs be denied, and the effects are quickly apparent throughout the entire structure of secondary motives!

Murray holds that an individual may be characterized in terms of his dominant motives.[10] He insists, furthermore, that these motives persist over long periods of time, running as consistent themes through the person's experience. There is an increasing number of longitudinal studies which show that the prototypes of complex, secondary motives appear quite early in the life of the child.[11] The preschool child who develops a strong interest in jig-saw puzzles may continue for many years to be interested in problems of design or pattern; the boy who deeply enjoys short walks with his kindergarten group may maintain his interest in the out-of-doors throughout his life; or the child whose first verbalized request of any complexity is to share his cookie with his sister may maintain an outgoing and generous spirit as a prominent personality characteristic. Indeed, longitudinal studies of personality more often than not trace a consistent logic through interests and attitudes from early years. The thesis of this chapter is that this persistence of interests and attitudes is not a chance thing, nor does it come about only because of the "nature" of the individual. It comes about through the learning process, and insures pattern, meaning, and integrity in the personality.

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[10] Henry A. Murray, *Explorations in Personality*. New York: Oxford University Press, 1938.

[11] See, for example, Patricia Neilon, "Shirley's Babies after Fifteen Years: A Personality Study," *Journal of Genetic Psychology*, LXXIII (December, 1948), 175-86.

How Interests Are Specialized

One of the important devices by which the young child acquires behavior patterns has been called *imitation*. Much of the play experience of the preschool child consists in carrying on the activities he sees about him in the family. He plays house, he plays car, he dresses up like adults, and with surprising accuracy mimics adults' conversational tones and expressions. Undoubtedly this process explains how some interests arise. In the process of playing out the actions and apparent intentions of other persons, the child develops new bases for his own activities, new reasons for the rationalization of interests.

Murphy links imitation to suggestibility and both concepts to the conditioned response.[12] Suggestibility appears chiefly in many simple motor responses, conditioned to words and gestures in particular and to authority sources in general, which create a favorable "set" wherein the more specific cues may operate. Imitation is taken to be an expression of the conditioned circular response; one's perception of his own response becomes the stimulus to a repetition of the response. Later the perception of the response in another person becomes an adequate stimulus to the response in the subject himself.[13]

Murphy goes further to describe a process he calls "canalization," following a term first used by the French psychologist Janet. Canalization denotes a process whereby "general motives (which are at first rather nonspecifically related to a class of stimuli) tend upon repeated experience to become more easily satisfied through the action of the specific satisfier than of others of the same general class."[14] Thus, among all toys available to them, children become used to and demand certain ones because of particularly satisfying experiences had with them. This process sounds like the reinforcement principle of the psychologist who describes learning as a process of conditioning. Murphy, however, distinguishes between canalization and conditioning. The reader with a theoretical bent is referred to him.[15]

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[12] Gardner Murphy, *Personality: A Biosocial Approach to Origins and Structure*, pp. 216-23. New York: Harper & Bros., 1947.

[13] For a more complete discussion of how the mechanisms of imitation are themselves learned and how they operate to assist the child in his acquisition of behavior patterns, see Neal Miller and John Dollard, *Social Learning and Imitation*. New Haven, Connecticut: Yale University Press, 1941.

The Satisfying Character of Interests

Regardless of which specialized terms and concepts we use to describe the development of interests, we generally fall back on the principle of satisfyingness. The child tends to continue as "interests" those activities which are satisfying. Presumably the stronger the general need satisfied by the activities, the more likely are the activities to become accepted as interests. A particularly strong need for companionship, for example, will direct a child toward activities carried on in groups, such as school clubs or Scouts. What particular interests develop within the framework of the group activity may depend on special abilities, on other less potent needs than the drive toward group activity, or on circumstantial factors, such as availability of equipment. A sensitive child's need to avoid hurt from teasing by others may be stronger than his need to be with others, and he will move toward more solitary activities. Again, his specific interests within the framework of "more solitary activity" will depend on a variety of factors.

Some interests arise through the satisfying repetition of behaviors observed in others. A child notes that a friend gains much pleasure from the collection and arrangement of postage stamps. He buys a packet and a beginner's album and discovers that the study of fine details, the arrangement of stamps in a particular order, and the reading of necessary historical information is satisfying to him, also. Perhaps the needs satisfied have to do with order, arrangement, curiosity, and affiliation with a person he likes. Whatever the sources, a new interest has appeared.

Some interests may result from activities one undertakes because of a favorable attitude toward an authority source. A child admires and respects a teacher very much. This attitude creates in him a disposition to believe in and to adopt ways of action recommended by this teacher. The teacher suggests to him that he might enjoy making a collection of leaves and indicates how they may be pressed and mounted. The child develops an engaging autumn interest. The activity, originally undertaken because a highly regarded teacher suggested it, becomes an interest in its own right.

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[14] Gardner Murphy, *op. cit.*, p. 162.

[15] *Ibid.*, pp. 164 ff.

Murphy notes that persistent interests may be understood in terms of the principle of overlearning.[16] Probably the frequency with which children exercise dominant interests accounts in some part for their persistence, but interests must continue to be satisfying or they will die out. Murphy notes further that interests change more rapidly than attitudes or values, presumably because interests are "conditioned stimuli, pursued because of their relations to goal objects which are valued."[17] As the relationship between the interests and the valued goal objects change, the interests are subject to extinction through disuse. They are also subject to reconditioning.

Developmental Status and Interests

The developmental status of a child, particularly with regard to the social roles he acquired, also affects the development of interests. As the child develops a concept of the self,[18] that is, as he becomes aware of the roles he fulfills in the group (whether at home, school, or with his chums), he may rule out certain activities or interests as inappropriate. Conversely, other interests are strengthened because they are seen by the child to fit the growing notion he has concerning himself. For instance, a child, in effect, says to himself: "Rough games are played by children who do not dress as well as I," or "Poetry-reading is for sissies, not for me," or "Real guys are good at football; therefore, I must do well, for I see myself as a 'real guy.'" The child's emerging awareness of himself as a self and the consequent expectations and demands he places upon his own behavior must affect the organization of his interest pattern.

The developmental status of a child affects the learning of interests in a still more direct manner. Many interests distinctly relate to a child's ability to perform. This relationship is most pronounced in the infant and very young child, who works away endlessly at a new performance in which he has just become successful. Having arrived at the ability to reach, grasp, and manipulate, the infant handles everything within reach. Having taken his first successful steps, he toddles everywhere. Jersild has remarked on this phenomenon as "developmental pre-eminence" and traces it through childhood into adolescence, showing how different occupations appear at different times in the individual's growth, but each with a certain urgency, causing the individual to concentrate more on those activities than others.[19] Boys in the upper elementary grades play catch, throwing and catching literally hundreds of times in a session. Little girls mastering the skipping rope carry the rope with them and spend time totaling many hours in practice.

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[16] *Ibid.*, p. 720.

[17] *Ibid.*, p. 283.

[18] For an extended discussion of the concept of the self, see Gardner Murphy, *op. cit.*, pp. 479-539.

The Reciprocal Relation between Interest and Ability

The interest a child shows in newly developed skills helps to carry the child through the practice necessary to mastery. This is a useful function of interest, for, in our society, much value is placed on achievement. Achievement valued by children frequently relates to skills which are used in various forms of group participation. Consequently, a child's persistence in an activity, such as a motor skill, results from the social values he discovers in it. It is frequently noted that the child who remains unsuccessful in a particular activity or who participates at a much lower level of skill than others in the group tends to withdraw from that activity. Conversely, it is possible that the child whose abilities permit quick mastery of skill, commands favorable attention from others. In terms of learning theory, the reward of social recognition should lead to reinforcement of the activity—the child concentrates more time on the activity and may even tend to select his friends in terms of his particular interest. Indeed, the specialization of many kinds of interests appears to develop by some such process.

Even in the case of the child whose skill is not quickly acquired, a strong interest in the performance may hold him to the arduous task of practice until mastery is reached. Such a case probably arises through a strong need for social recognition and an awareness of the value of good performance.

It is probably true that for most children interest in activities tends to grow as performance improves. A child may originally undertake an activity because it is being done in his group and, through successful performance, may develop a keen interest in the activity which carries him far beyond his initial motivation.[20] To make an enthusiast out of the indifferent man who "went along with" the fishing party, there is no incentive quite so successful as landing his first bass. This phenomenon should be recognized by all teachers. Encouragement or persuasion may be quite in order in the introduction of a child to an activity, if he has had no previous experience. Many times, the unwilling child becomes a most enthusiastic participant as he develops some proficiency. Skilful motivation on the part of the teacher may be required for the child with the "inferiority complex." Frequent experiences of failure appear to create a generalized fear of failure which will make the person withdraw from the first trial of a new activity.

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[19] Arthur T. Jersild *et al.*, *Child Development and the Curriculum*, pp. 13 ff. New York: Teachers College, Columbia University, 1946.

It is a mistake, however, to assume that a child's spontaneous interests will always reflect his abilities. While it is true, in general, that interests and skills are reciprocally related—high skill guaranteeing considerable interest in performance and strong interest tending to insure adequate skill—this is not always the case. Particularly in the elementary-school period, a time when many complex motor skills are being acquired, interest is a poor indication of potential skill. This period best represents an age of exploration. Lehman and Witty have shown that play interests are at a maximum in variety at about eight or nine years of age.[21] The wise teacher will recognize that any expression of interest ought to be encouraged, and she will not immediately be dissuaded by the first avowal of lack of interest. Children at this time are to be encouraged to try a great variety of activities, for only through exploration will they "test their own limits," as it were, discovering skills in which they can develop strong rewarding interest.

Interest patterns become appreciably more stable during the teen years.[22] It is possible that the relation between expressed interest and skill increases during adolescence by virtue of the fact that unskilful performances are dropped, the individual concentrating more and more on his expertly performed activities. In these later years, then, a child's lack of interest may have more meaning, and a teacher's reluctance to crowd him into an activity he dislikes for fear of unfortunate personality outcomes may have more basis than in the much younger child.

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[20] This phenomenon is akin to Allport's functional autonomy of motives. See Gordon Allport, *Personality: A Psychological Interpretation*, p. 194. New York: Henry Holt & Co., 1937.

[21] Harvey C. Lehman and Paul A. Witty, *The Psychology of Play Activities*. New York: A. S. Barnes & Co., 1927.

[22] Edward K. Strong, *Vocational Interests of Men and Women*, pp. 353-80. Stanford University, California: Stanford University Press, 1943.

This patterning process in interests is highly significant for mental hygiene or personality development. A standard clinical technique for working with the unhappy child is to discover and accent something he can do well. The salutary effect of group approval is quite well recognized and exploited by good teachers.

In summary, then, a child's interests tend to grow and to channelize along with his developing abilities and skills. He generally likes to do what he can do well. Conversely, he tends to be uninterested in activities in which his performance is particularly poor. As a young child he generally attacks unself-consciously and with enthusiasm a great variety of activities. As he grows older, his increasing awareness of himself as a person, of his social roles, and of the expectations of parents and teachers and the greater demands of organized living cause him to concentrate his interests into activities which he finds particularly satisfying—frequently those in which he commands favorable attention because of good performance. Even in the more solitary hobbies and crafts, the social recognition awarded the finished product is frequently an important factor in maintaining and strengthening interest.

A GENETIC VIEW OF THE ORIGIN OF ATTITUDES

Several summaries of studies of attitudes held by children are available.[23] The mass of studies relate to high-school and college youth. The few studies that compare older and younger children are based on different groups tested on one occasion; follow-up or longitudinal studies of the same children are much needed. In general, those who have written on attitudes from the theoretical point of view take a genetic perspective.

Allport discerns four sources of attitudes.[24] (*a*) They may develop through the *integration* of numerous specific responses of a similar type. Thus, a number of unfortunate experiences with different members of a cultural group may bring one to the belief that "all such people are unpleasant." (*b*) Attitudes may also arise from general approach or withdrawal tendencies. This point of view holds that specific behaviors differentiate out of broad, primitive reaction tendencies. Thus, specific attitudes of distrust or hate may develop gradually out of more general, diffuse patterns of dislike. (*c*) Attitudes, too, may result from single dramatic experiences. Cruelty received from a child of another ethnic or cultural group may quickly crystallize a strong attitude toward all members of that group. (*d*) Finally, attitudes may be taken over ready-made from others. In the case of children, the source is usually their parents. It is this last process which Allport considers most important in the genesis of attitudes.

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[23] Albert Ellis and J. Raymond Gerberich, "Interests and Attitudes," *Review of Educational Research*, XVII (February, 1947), 64-77; Gardner Murphy, Lois B. Murphy, and Theodore M. Newcomb, *Experimental Social Psychology*, pp. 889-1046 [New York: Harper & Bros., 1937 (revised)]; Mary Cover Jones and Barbara S. Burks, *Personality Development in Childhood*, pp. 66-84 (Monographs of the Society for Research in Child Development, Vol. I, No. 4. Washington: National Research Council, 1936).

[24] Allport, "Attitudes," *Handbook of Social Psychology*, op. cit., pp. 810 ff.

As with interests, the process known as imitation is undoubtedly important in taking over ready-made attitudes. In imitating the behaviors expressing distaste or disdain which adults may show for certain persons, foods, or institutions, the child acquires prejudices concerning such persons, foods, or institutions.

Sympathy, so thoroughly studied by Lois Murphy,[25] is important, along with imitation, in framing a theory of attitude formation. Psychologists with psychoanalytic leanings carry the concepts of imitation and sympathy further into the concepts of introjection and identification. Introjection is the process whereby a person adopts another person's behavior or feeling. Introjection differs from imitation, for introjection is unconscious, whereas imitation is deliberate, conscious. Introjection generally relates to the action of the total personality, whereas imitation usually reflects some very specific skill or act.[26] Identification is a state of close emotional affiliation which results from introjection. As the child "feels" the actions and moods of other persons into himself he acquires a basis for attitudes similar to theirs.

To the psychological mechanisms of imitation, sympathy, introjection, and identification must be added the influence of the frequent parental practice of dichotomizing the child's experience into "good" and "bad." Such terms are applied to his actions, to objects with which he seeks to satisfy his wants, to other persons, to their behavior, and to many additional aspects of experience. Undoubtedly many attitudes arise from these simple value judgments. To the extent that the child considers his parents powerful and "good" (and he will usually so consider them, as parents are his early sources of satisfactions and comfort), he will generalize his parents' expressions of belief. Overheard opinions will be reiterated staunchly as true because "daddy (or mother and, later, teacher) said so." With time, the child will discriminate or differentiate specific opinions and beliefs within the larger framework of his parents' approvals and disapprovals.

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[25] Lois B. Murphy, *Social Behavior and Child Personality*. New York: Columbia University Press, 1937.

[26] For a discussion of several meanings of identification, see Percival Symonds, *The Dynamics of Human Adjustment*, pp. 177 f., 318 ff. New York: D. Appleton-Century Co., 1946.

Many other social psychologists agree with Allport that the child takes over his attitudes (or at least the basis for them) ready-made. Attitudes toward persons of other races or nationalities have been studied most frequently;[27] these attitudes in particular seem to be acquired uncritically and to have little basis in experience. Probably a combination of this method with Allport's first-mentioned method—the integration of numerous responses of a similar type—serve to explain the development of most attitudes.

The primary significance of parental attitudes is attested by many studies. Specific attitudes, such as racial prejudices, are apparent by the time the child enters school.[28] It is important for teachers to realize that children are not "unwritten pages" but inscribed with many likes, prejudices, opinions, and beliefs. Since many of these attitudes reflect basic values of the home, the teacher must proceed to introduce broader viewpoints with a fine sense of fair-mindedness.

Children tend to resemble their parents more than their siblings in the specific attitudes they hold, and they resemble fathers about as much as mothers.[29] There is a closer relationship between attitudes held by parents and those held by children in lower socioeconomic groups. The resemblance to parental views, however, declines with age in all groups. How much this trend reflects education per se and how much it reflects a declining parental influence as the child develops greater independence is indeterminate. Probably, however, codes uncritically accepted from adults gradually give way to new codes, based on demands of changing conditions of living, to which youth appear more responsive than mature adults.

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[27] For examples of such studies, see the following: Kenneth B. Clarke and Mamie K. Clarke, "Segregation as a Factor in the Racial Identification of Negro Preschool Children: A Preliminary Report," *Journal of Experimental Education,* VIII (December, 1939), 161-63; George H. Green, "Have Children a National Bias?" *Discovery,* XIII (February, 1932), 44-46; Eugene L. Horowitz, "The Development of Attitude toward the Negro," *Archives of Psychology,* Vol. XXVIII, No. 194 (New York: Columbia University, 1936); Daniel Katz and Kenneth Braly, "Racial Stereotypes of One Hundred College Students," *Journal of Abnormal and Social Psychology,* XXVIII (October, 1933), 280-90; Hyman Meltzer, "Hostility and Tolerance in Children's Nationality and Race Attitudes," *American Journal of Orthopsychiatry,* XI (October, 1941), 663-75.

[28] For examples, see: Horowitz, *op. cit.;* Helen G. Trager and Marian J. Radke, "Early Childhood Airs Its Views," *Educational Leadership,* V (October, 1947), 16-23.

[29] Theodore Newcomb and George Svehla, "Intrafamily Relationships in Attitude," *Sociometry,* I (July and October, 1937), 180-205.

Another important age trend in attitudes has been noted—that of increasing correlation between different but related attitudes. Thus, the study of Horowitz[30] shows, with age, an increasing correlation among the different techniques of revealing one's attitude toward the Negro. Cantril[31] has advanced evidence that generalized as well as specific attitudes do exist, and Allport accedes to this view.[32]

Material such as that just cited may be interpreted to support the notion that attitudes develop by a process of integration. Yet, as in behavior in general, probably processes akin to both integration and differentiation exist. As the child grows older, his capacity for making discriminations increases, and through experience he learns many new, specific grounds upon which to make discriminations. Blake and Dennis[33] state that in groups of younger as contrasted with older children, a greater variety of viewpoints exist concerning the Negro. Whereas there is evidence that young white children hold a generalized unfavorable attitude toward the Negro, the specific traits attributed to the colored race are not as uniformly accepted as among older children. Apparently younger children have not learned as many specific beliefs concerning the Negro—that he is lazy, he likes to jig, he likes music and watermelons, he wears a battered straw hat and ragged jeans, and the like—and has not yet woven them into the generalized stereotype.

One may explain inconsistencies among attitudes in terms of the highly varied experiences which the individual has and affirm that apparently contradictory attitudes may actually perform similar personality functions and thus actually be "consistent" within the personality.[34] On such a basis one can explain the person of his acquaintance who, seemingly inconsistent, always takes the unpopular side of the argument and is now "liberal" and now "conservative," depending upon who is present. Presumably his need to draw attention causes him to take, at the moment, the unpopular view.

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[30] Horowitz, *op. cit.*

[31] Hadley Cantril, *General and Specific Attitudes*. Psychological Monographs, Vol. XLII, No. 192. Princeton, New Jersey: Psychological Review Co., 1932.

[32] Allport, "Attitudes," *Handbook of Social Psychology, op. cit.*, pp. 820 ff.

[33] Robert Blake and Wayne Dennis, "The Development of Stereotypes concerning the Negro," *Journal of Abnormal and Social Psychology*, XXXVIII (October, 1943), 525-31.

Many studies have noted an increasing liberalization of views with increased schooling.[35] One study, conducted in Wales, noted no change in prejudice with age, only an increasing ingenuity in defending opinions.[36] Another study remarks on a consistent drop from the seventh to the twelfth grades in freedom from prejudice judged in terms of reported personal practices. This trend in actual behavior accompanies an increased agreement between student opinion and liberal "experts" as to desirable behavior toward minority groups.[37] Shanck revealed a difference between the attitudes of persons as persons and of the same persons as members of social institutions.[38] This distinction has not always been clear in recent studies, yet it undoubtedly exists. It is, however, a distinction which probably does not apply to the child as clearly as to the adult, for the individual "self" appears to be made up of many selves and is a product of experience and membership in many groups.[39] Another effect of the group is revealed by Marple, who showed that high-school youth, college students, and adults, in that order, are decreasingly influenced in their opinions by knowledge of both "majority opinion" and "expert opinion," the decline in influence of the latter being slightly greater.[40]

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[34] For a development of this position, see Murphy, Murphy, and Newcomb, *op. cit.*, pp. 912 ff. and 1031.

[35] For examples, see the following references: Orlie Clem and Marcus Smith, "Grade Differences in Attitudinal Reactions of Six-year Secondary Pupils," *Journal of Educational Psychology*, XXV (April, 1934), 297-309; Julius B. Maller and Gerhard E. Lundeen, "Sources of Superstitious Beliefs," *Journal of Educational Research*, XXVI (January, 1933), 321-43; Newcomb and Svehla, *op. cit.*; and Percival Symonds, "A Social Attitudes Questionnaire," *Journal of Educational Psychology*, XVI (May, 1925), 316-22.

[36] Green, *op. cit.*

[37] Ralph D. Minard, "Race Attitudes of Iowa Children," *University of Iowa Studies: Studies in Character*, Vol. IV, No. 2. Iowa City, Iowa: University of Iowa Press, 1931.

[38] Richard L. Shanck, *"A Study of a Community and Its Groups and Institutions Conceived Of as Behaviors of Individuals*. Psychological Monographs, Vol. XLIII, No. 195. Princeton, New Jersey: Psychological Review Co., 1932.

[39] For a discussion of the growth of the self, see Murphy, *op. cit.*, pp. 479-522.

[40] Clare H. Marple, "The Comparative Suggestibility of Three Age Levels to the Suggestion of Group vs. Expert Opinion," *Journal of Social Psychology*, IV (May, 1933), 176-86.

Thus, the teacher, as expert, can expect to wield less direct influence than she might desire over the attitudes of older children and adolescents. Probably she will exert less influence on children than will their peers.

Child psychologists and social psychologists find that interests and attitudes are of considerable importance in the process of socialization of the child. Sherif and Cantril locate the formation of the ego or self in the development of attitudes.[41] For them the ego is made up of the attitudes, social norms, and values which the person has "interiorized"—their term for learning, accepting, and making an intimate part of one's experience. Beliefs, opinions, and dispositions to action are important, for a person's successful functioning as a social personality will depend on the coherence of his attitudes.

Present knowledge, then, inclines one to the view that many, if not most, attitudes are acquired early as broad dispositions which affect the individual's later perceptions and learnings. His specific attitudes emerge from experiences thus selectively influenced. Thus, a child early recognizes the disapprobation or contempt in his father's expression, "He's a Jew," and all his later experiences are colored by that emotional set. Gradually he acquires specific attitudes within this general framework: "Jews are sharp," "They cheat a customer if they can," "They are noisy and aggressive," etc., until a highly differentiated, yet integrated, attitude exists. In this process the family and the peer group seem to be most important of all social influences. What a person privately believes may differ somewhat from his officially represented viewpoint as a member of this or that group. He may privately condone drinking of alcohol with his business companions yet, as member of a church, register his approval of teetotal propaganda. And, indeed, his divergent opinions may reflect consistent personality needs, for example, to be approved in whatever group he happens to be at the time.

THE RECIPROCAL RELATION BETWEEN PERCEPTION AND ATTITUDES

We have already noted that children's attitudes are formed in the context of beliefs, prejudices, and opinions expressed by parents and that early attitudes tend to cast into the broad primitive categories of "goods" and "bads." We have noted also that the growing child's experience tends to refine and elaborate these early or "primitive" attitudes into more detailed, organized, and specific attitudes. Indeed, many psychologists hold that most experience is perceived selectively in terms of antecedent attitudes or "sets," called by Sherif and Cantril a "frame of reference."[42] A person's observations and recollections are "loaded" by old attitudes carried into new experiences. This reinforcement of attitudes by the selective learning of material congruent with the learnings already acquired is akin to Murphy's process of canalization noted earlier. The reinforcement of some elements of attitudes and the elimination of others accounts for the "differentiation" of broad, primitive attitudes into specifics and the "integration" of related specific attitudes into general attitudes. We utilize these general attitudes of friendliness or coldness, liberalism or conservatism, objectivity or emotionalized thinking, and many others when we make brief personality descriptions of our acquaintances. Probably these general attitudes are among the relatively stable aspects of personality which give integrity or "character" to the person.

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[41] Muzafer Sherif and Hadley Cantril, *The Psychology of Ego-Involvements.* New York: John Wiley & Sons., 1947.

The observant teacher witnesses many illustrations of this principle of selectivity or congruence in learning. Children continually misinterpret or "slant" material the teacher presents, no matter how carefully he does his job. One study with older students shows clearly how attitudes toward material read influenced the writing of summaries of the material upon recall.[43] Summaries produced on a second occasion were influenced by original attitudes to a greater extent than were the first summaries. Leuba and Lucas have shown how experimentally induced attitudes of "happiness," "criticalness," or "anxiety" affected in different ways their subjects' descriptions of photographs they viewed.[44]

Zillig's study has frequently been cited as a demonstration of how attitudes may influence perception and report.[45] Popular and unpopular children were asked to do simple exercises, upon command, such as raising an arm. Previously, the popular children had been instructed to follow the instructions incorrectly, while the unpopular children were to respond correctly. When asked to list the names of those making mistakes, other children in the class preponderantly reported the unpopular children as incorrect. The unreliability of perception of prejudiced witnesses is well known in courts, for prejudice is little more than an attitude strongly held in deliberate or accidental ignorance of facts.

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[42] For amplification of this position, see: Katz and Braley, *op. cit.;* Sherif and Cantril, *op. cit.*, pp. 64 ff.

[43] Wendell Johnson and Carolyn Wood, "John Told Jim What Joe Told Him: A Study of the Process of Abstracting," *Etc., A Review of General Semantics,* II (September, 1944), 10-28.

[44] Clarence Leuba and Charles Lucas, "The Effects of Attitudes on Descriptions of Pictures," *Journal of Experimental Psychology,* XXXV (December, 1945), 517-24.

[45] Maria Zillig, "Einstellung und Aussage," *Zeitschrift für Psychologie,* CVI (1928), 58-106.

The significance of attitudes in perceptual processes has experimental support in the work of Bruner and Goodman who have shown how economic and social status values affect visual perceptions.[46] Children from poor families consistently overestimated the size of coins to a greater extent than did children from better circumstances. Frenkel-Brunswik has also shown that tolerance of ambiguous figures, a factor in visual perception, appears to be related to prejudice and personality rigidity.[47]

Not only do attitudes and interests influence perception, but perceptual factors themselves undoubtedly influence the development of interests and attitudes. Sherif and Cantril consider that attitudinal reactions, being judgmental activities, necessarily involve antecedent perception.[48] That attitudes are selectively held is embedded in the fact that perception is selective. Frenkel-Brunswik holds that personality factors such as insecurity, aggressiveness, and the like appear to increase the likelihood of prejudicial attitudes.[49] Presumably such personality characteristics cause a person to perceive in certain ways rather than others. The selective operation of intelligence and other personality characteristics in the determination of interest patterns has long been recognized,[50] and interest tests are frequently included in any complete clinical study of personality.

The question of antecedence—whether perceptual processes or attitudinal and interest factors come first—reminds one of the hen-egg problem. There is undoubtedly a continuing, reciprocal relationship between the two. The fundamental significance of emotion in the canalization of interests and attitudes cannot be doubted, however. Collier has shown that knowledge about and recognition of propaganda techniques in printed material fail to prevent measurable reinforcement of attitudes when the material is read.[51] This type of evidence supports the view that perception and attitudes and interests are related in a very complex manner. Teachers must recognize in their methods and in their materials that something beyond simple intellectual appeals is needed in school learnings. They must also be aware continually how differing experience backgrounds cause students to comprehend in quite different ways the learning situations produced in the classroom.

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[46] Jerome Bruner and Cecile Goodman, "Value and Need as Organizing Factors in Perception," *Journal of Abnormal and Social Psychology*, XLII (January, 1947), 33-44.

[47] Else Frenkel-Brunswik, "Tolerance toward Ambiguity as a Personality Variable," *American Psychologist*, III (July, 1948), 268.

[48] Sherif and Cantril, *op. cit.*, pp. 34 ff.

[49] Else Frenkel-Brunswik, "Personality and Prejudice in Women," *American Psychologist*, I (July, 1946), 239.

[50] For illustrative studies, see: Lehman and Witty, *op. cit.;* Lewis M. Terman, *Genetic Studies of Genius*, Vol. I: *Mental and Physical Traits of a Thousand Gifted Children* (Stanford University, California: Stanford University Press, 1926).

MODIFICATION OF INTERESTS AND ATTITUDES

It is obvious that interests and opinions do develop or change. The problem is "What kinds of experience foster change?" Closely tied to this issue is the question of the direction of change. For the most part, modern educators agree on the desirability of the *enrichment* (i.e., the diversification) of interests, especially interests which result in pleasure to the individual and to others and which afford a more constructive basis for human relations. Concerning attitudes, likewise, there is broad acceptance among public school teachers of a liberal, idealistic position on matters pertaining to human relations, economics, the rights of the individual, international relations, the importance of facts, and the individual's right to hold his own viewpoints, so long as he does not take unfair advantage of others. On specific social, political, economic, and religious attitudes there is much less agreement.

Although all serious students of learning recognize that attitudes and interests as well as knowledges and skills change, the developmental point of view stresses that this change is not haphazard for the individual, nor is it always in the same direction for all persons subjected to similar experience. The individual has an integrity as a functioning organism which plays a part in the learning process. Throughout this chapter there is emphasis upon this point—that the child generally selects from available experience that which is consonant with his needs and aims and with the results of previous learnings. The true "conversion" or sudden, radical, and permanent shift in point of view or in preoccupying interests is dramatic and also infrequent. Children continue to be much the same sort of persons they have been. To put it somewhat more accurately, children generally change in directions which are in keeping with earlier trends. This principle becomes increasingly true the closer the child is to maturity. More than one psychological observer has noted how temporary or superficial are the apparent shifts in viewpoint or behavior of persons, how infrequent are fundamental changes in developmental direction.

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[51] Rex Collier, "The Effect of Propaganda Following a Critical Examination of the Propaganda Itself," *Journal of Social Psychology*, XX (August, 1944), 3-17.

The school plays a very basic part in the process by which the psychological boundaries of the child's "life space" are progressively enlarged beyond the area afforded by his family. Chief among the broadening influences operating on the child are his associations with chums, his play activities, his vicarious experiences gained through reading, the movies and radio programs, and his contacts with adults (other than his parents) who represent authority whether the teacher, the clergyman, or the policeman. Many of these influences are encountered, formally or informally, in the school and its activities. Experiences with these agents of society insure learning and the consequent modification of interests and attitudes.

We really cannot say to what extent the school reaches into the private lives of children where interests and attitudes are developed. Studies of teachers' impact upon children, such as those conducted by Witty, show that certain teachers stand out in the experience of children and that some experiences are much more significant than others.[52] Obviously any one school program does not have a uniform effect on the children passing through it; the wide individual differences revealed in every survey or study attest this.

Educators and supervisors often remark on the variation in practice found among teachers, even when basic syllabi or courses of study are painstakingly developed. Indeed, such is our devotion to democracy that these differences are generally regarded as strengths of our educational system. The net result of this wide variation for the individual is, first, diversity of opportunity and experience and, second, freedom (in effect) for the child to develop individual patterns of interests. Diversity of educational opportunity and experience is frequently deplored. Actually, we do not condemn diversity as such; we condemn limitations placed on opportunities for some children. In the richest learning situation, there is great variation in kinds of motivation used, in materials and experiences available, and to some extent in types of outcomes recognized as worthful.

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[52] Paul A. Witty, "An Analysis of the Personality Traits of the Effective Teacher," *Journal of Educational Research,* XL (May, 1947), 662-71.

In their attempts to simplify and comprehend their tasks, some teachers continually seek uniform solutions to all problems of motivation. Such teachers often find teaching burdensome, for their efforts to fit single keys to all doors are constantly thwarted. Teaching is a continuing adventure for those persons who know that the motivation of learning is relative to the individual child and for those who use a bunch of keys, perhaps almost as many as their children.

In sharp contrast to American educational practice appears the totalitarian philosophy developed in several European countries in recent decades. School curriculums have been standardized and rigidly enforced. Educators in totalitarian systems have apparently recognized that children's experiences in the after-school hours vary considerably and that the home competes with the state as an object for loyalty. Such systems have created youth programs, extending down through the elementary grades, wherein the child's time outside of school hours can be effectively controlled and standardized and the home's influence minimized. Such procedures in controlling interests and standardizing attitudes have been notably effective. The effectiveness of such controls may occasionally tempt American educators. However, the fullest development of each individual's intrinsic potentialities is still a compelling American ideal. The preservation of variety in teaching methods, in materials, and in educational procedure appears to be our best insurance to preserve this ideal.

Many Americans appear to hold a simple faith that the standardized attitudes of persons in totalitarian countries can be changed in a relatively short time by introducing the heterogeneous procedure common in American education. To the psychologist who accepts as valid the dynamics of learning assumed in the present chapter, this faith appears quite unwarranted. Attitudes once established do not readily reconstruct themselves; they continue to color perceptions and consequently to affect learnings.

Experimental studies on the efficacy of specific educational procedures to modify attitudes have suffered from their brevity in point of time. For the most part designed as dissertations for graduate degrees, studies of the effectiveness of various forms of motivation have been limited to a period of weeks, or to a semester. On the other hand, the process we have described is pervasive and occurs in a much longer time dimension. To say, then, that particular educational procedures do not appear to yield measurable results is unfair. It is also unfair to claim findings inferred from descriptions of long-time programs in a given school as scientific. By their very nature, schools are committed to results; they cannot establish for long-range demonstrations the necessary "control groups" in which no special influences are introduced.

Studies of children's interests uniformly have been of the descriptive, survey type. There are no experimental studies of the modification of leisure-time interests, wherein suitable control or comparison groups have been established. The study of group atmospheres by Kurt Lewin and his colleagues, while directed toward a somewhat different purpose, did introduce the factor of control and showed how certain forms of leadership were related to group interest and productivity.[53]

In the area of attitudes, however, a different condition obtains; the experimental approach has been used quite extensively.[54] For the most part, studies have attempted to identify the direction and amount of opinion change resulting from specific units of study. Other researches have concerned themselves with the eradication of superstitions and erroneous beliefs or with effects of special propaganda appeals. Lichtenstein's review of the literature lists fourteen studies indicating some effect on attitudes of teaching designed to modify specific opinions, fourteen studies which yielded no change, and three studies where results were indeterminate.[55] Lichtenstein's own study gave positive results. A comprehensive review of work since his publication would probably indicate a similar division on conclusions. A number of studies indicate positive results accruing from classroom instruction and, in general, report that emotional appeals are more effective than intellectual appeals.[56]

Doob[57] has shown that supposedly alert young adults are not always aware of changes produced in their attitudes, a finding which can probably be generalized to younger, less sophisticated children.

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[53] Kurt Lewin, Ronald Lippitt, and Ralph K. White, "Patterns of Aggressive Behavior in Experimentally Created 'Social Climates,'" *Journal of Social Psychology*, X (May, 1939), 271-99.

[54] For summaries of such studies, see Ellis and Gerberich, *op. cit.*, and Murphy, Murphy, and Newcomb, *op. cit.*

[55] Arthur Lichtenstein, *Can Attitudes Be Taught?* John's Hopkins University Studies in Education, No. 21. Baltimore, Maryland: John's Hopkins Press, 1934.

[56] Such studies as the following are illustrative: Richard M. Batemen and Herman H. Remmers, "A Study of the Shifting Attitude of High-School Students when Subjected to Favorable and Unfavorable Propaganda," *Journal of Social Psychology*, XIII (May, 1941), 395-406; Earle E. Emme, "Modification and Origin of Certain Beliefs in Superstition among 96 College Students," *Journal of Social Psychology*, X (October, 1940), 270-91; Selden C. Menefee and Audrey C. Granneberg, "Propaganda and Opinions on Foreign Policy," *Journal of Social Psychology*, XI (May, 1940), 663-75.

[57] Leonard W. Doob, "Some Factors Determining Change in Attitude," *Journal of Abnormal and Social Psychology*, XXXV (October, 1940), 549-65.

Two studies on the effects of field trips on attitudes differ as to the influence of such realistic, firsthand experiences. Epstein concludes that a four-day trip brought about measurable changes in political and social attitudes of children.[58] W. J. Jones reports no differences on a variety of attitude, information, and reasoning test performances of a group of children taken to New York City for a week's field study of social problems as contrasted with changes found in a control group which remained at home.[59] He stoutly affirms his faith in the value of field trips, however. On the other hand many studies reveal the greater value of visual aids as compared with printed matter in producing attitudinal as well as factual learnings.[60] Bollinger found no relationship betwen social attitudes of teachers and *changes* in attitudes of pupils working with the teachers.[61] One may view such a finding as fortunate or unfortunate, depending upon his judgment concerning the attitudes held by the teacher. Or he may view the result as indicating that teachers do not have the impact on children's value systems many of us have assumed. Timmons found that class discussions helped students select good solutions to defined social problems but did not affect underlying attitudes.[62] Eckert and Mills found no difference in attitudes between students having only one social-science course in high school and those having two or more.[63] Presumably, the high-school courses were themselves consistent in presenting social viewpoints, though there was no guarantee of this. Gardiner noted a "cancelling out" effect when pro-and-con materials were presented in one class and a cumulative effect when only contramaterials were presented in another.[64] Peterson and Thurstone, likewise, have commented on this cumulative effect of materials presenting similar biases.[65] All films in their study produced changes in mean attitude score, many of them statistically significant. Several films presenting similar viewpoints produced cumulative changes when shown serially. Also, the significant effect of devices designed for entertainment rather than didactic purposes may be significant for educators to consider.

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[58] Leon J. Epstein, "Attitudinal Changes Attendant upon Variations in Experience," *Journal of Educational Research,* XXXIV (February, 1941), 453-57.

[59] William J. Jones, "Measuring Some Outcomes of a Field-study Experience," *Educational Research Bulletin* (Ohio State University), XIX, No. 2 (1940), 31-47.

[60] There are many studies of the efficacy of visual aids. Among the early ones which forcefully demonstrated this point are several volumes in the Payne Fund Studies, notably, P. W. Holaday, and George D. Stoddard, *Getting Ideas from the Movies* (New York: Macmillan Co., 1933); Ruth C. Peterson and L. L. Thurstone, *Motion Pictures and the Social Attitudes of Children* (New York: Macmillan Co., 1933); Frank K. Shuttleworth and Mark A. May, *The Social Conduct and Attitudes of Movie Fans* (New York: Macmillan Co., 1933).

[61] Russell V. Bollinger, "The Social Impact of the Teacher on the Pupil," *Journal of Experimental Education,* XIII (June, 1945), 153-73.

[62] William M. Timmons, *Decisions and Attitudes as Outcomes of the Discussion of a Social Problem.* Teachers College Contributions to Education, No. 777. New York: Teachers College, Columbia University, 1939.

[63] Ruth E. Eckert and Henry C. Mills, "International Attitudes and Related Academic and Social Factors," *Journal of Educational Sociology,* IX (November, 1935), 142-53.

The apparently significant effect of the casual and incidental in modifying children's attitudes and interests has frequently been remarked. Observant parents know well how incidental comments, oblique requests, and casual experiences can be influential in children's behavior, while more direct approaches meet resistance. Teachers' incidental remarks to individual children are frequently as significant as special instruction planned with care and executed with the group. The writer is of the opinion that the difference lies in the more personal relationship established in the "off-guard" moment as contrasted with the more structured situation. The child usually sees the teacher as authority. In the more personal relationship established in incidental contacts, the content of the experience is more emotionally relevant to the child's personality needs. In the more formally structured "teaching" situation, the child's need for integrity as a person may resist somewhat more the teacher's demands and expectations.

Throughout this discussion, the writer has implied the greater influence of emotional than of rational elements of experience for the development of interests and attitudes. Some clues concerning the effectiveness of the school in fostering attitude and interest development may be found by exploring children's attitudes toward school itself. Tenenbaum has published a scale to measure attitudes toward school, teachers, and classmates.[66] Sixth- and seventh-grade children in New York City are predominantly critical, 20 per cent being distinctly dissatisfied and another 40 per cent being critical of many phases. Teachers were mentioned as the chief reason for disliking school, yet teachers were, on the whole, better liked than the school experience itself. Only a small percentage (8 per cent) expressed unfavorable attitudes toward classmates. Tschechtelin and Hipskind found on another scale a "substantially favorable" attitude toward teachers, on the average, though they present no comparative norms or scale values which the reader may himself assess.[67]

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[64] Iva C. Gardiner, "Effect of a Group of Social Stimuli upon Attitudes," *Journal of Educational Psychology,* XXVI (September, 1935), 471-79.

[65] Peterson and Thurstone, *op. cit.*

[66] Samuel Tenenbaum, "Attitudes of Elementary-School Children to School-teachers and Classmates," *Journal of Applied Psychology,* XXVIII (April, 1944), 134-41.

Possibly the unfavorable attitude shown by these studies and rather commonly experienced in contacts with older school children reflects the growing child's need for freedom and independence. Possibly it reflects no more than the widespread and apparently thoroughly American characteristic of unfavorable criticism of his institutions. It would seem, however, that the resistance and, at times, hostility directed by many children toward the school and the teacher may account for the earlier mentioned signficance of the pupil's casual contact with the teacher out of her formal context.

The formal, group-didactic approach lacks not only the personal reference but also the emotional basis needed for favorable attitude creation or change, or interest arousal. Inasmuch as interests and attitudes, the latter especially, have strong emotional components, it follows that any specific experience which particularly affects a child's emotions affords an opportunity for significant development of attitudes and interests. A birth or a death in the family, change of residence, conflict with a friend, the sudden discovery of warmth, sympathy, and interest in a teacher or in another child known only indifferently, an awe-inspiring experience with nature, the sense of complete well-being which occasionally and momentarily pervades a child's life illustrate such experiences. Adolescence has been viewed as a period of new discovery of the self—new powers, new physical sensations, new social opportunities and demands. Such a period, of course, affords a real opportunity for the development of new intellectual horizons—new interests and attitudes. Good teachers know and utilize this fact, yet it is necessary to recall this aspect of adolescence to adults who have forgotten the significance of the period in their own experience.

This chapter has emphasized that interests and attitudes express the personality needs of the individual. Interests and attitudes are the externalizations of the web of desires for status, recognition, affection, dominance, and all the other needs which comprise the motivational structure. Mental hygiene has long stressed the desirability of harmony or "integration" within the personality—implying that these desires and needs can operate as a system, permitting the individual to function smoothly in his work and associations with others, or they can operate disharmoniously to produce tension and conflict and reduce the individual's efficiency. Discerning students of personality note that tension and conflict in some degree are never absent, that the key to adjustment seems to be in the individual's skill in meeting his needs. Interests and attitudes appear to aid in the satisfaction of needs, and the literature of mental health again and again cites the positive benefit of varied and creative interests, of definite yet flexible attitudes.

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[67] Sister M. Amatora Tschechtelin and Sister M. John Francis Hipskind, "Measuring the Attitudes of Elementary-School Children toward Their Teachers," *Journal of Educational Psychology*, XXXI (March, 1940), 195-203.

Social psychology is recognizing the significance of the "self," relating the image which the person holds of himself to the social role he develops in his interactions with others. Childhood and adolescence are certainly the periods when the self-image develops, when the social role is in large part defined. Counseling and psychotherapy with young adults amply support the thesis that adjustment difficulties of later adolescence and early maturity are occasioned by inadequate development of socially acceptable and personally satisfying attitudes and interests during the early developmental periods.

In this fascinating yet relatively unorganized area of psychological knowledge there is great need for experimentation. Descriptive research is available to some extent. Learning theory must be developed and applied to these areas as well as to simple intellectual and motor skills. It is to be hoped that a yearbook such as this one ten or twenty years hence can provide a much more definitive statement than is now possible concerning how children learn attitudes and interests.

CHAPTER VI

HOW CHILDREN LEARN PERSONAL AND SOCIAL ADJUSTMENT

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A Definition of Adjustment

We may think of problems of personal-social *adjustment* as the resultants of two sets of forces. There are those forces which emerge from the individual himself—his purposes, desires, and needs; and there are forces which derive from the social world in which he lives. Each person experiences these as the demands, expectancies, and pressures of his environment. There is probably no moment in anyone's life when, to a greater or less degree, these two sets of dynamic forces are not interacting—even in our sleep we dream. Adjustment then cannot ever (after infancy) be a matter of simple, direct gratification of impulses and needs. It becomes a matter of integrating one's own needs and purposes with the purposes of the social world in which we live.

Two essential aspects of living organisms are the need to change, to grow and differentiate toward greater complexity, and the need to integrate and to maintain equilibrium and wholeness, to consolidate our gains. But this latter never means the static "adjustment" of the well-oiled functioning of the machine in good working order. Rather we must think of the individual's adjustment as a process in which, through interacting with his environment, he deals with his adjustment needs continually. He behaves in certain ways in order to maintain equilibrium or to relieve the tensions that come from imbalance.

When the individual finds his purposes and needs fulfillable in the social groups in which he interacts, and when the expectancies of those groups are such that he can meet them to the satisfaction of all concerned, we think of that individual as "well-adjusted." Perhaps it would be better to think of him as "adjusting well," because even such a person must continually act upon, or do something about, the forces that play upon him. But when the individual fails to fulfil his basic purposes and fails to meet the expectancies of the groups in which he must interact—family, play group, classroom group, the larger community—then his overt behavior and his private world must be marked by tension, anxiety, or guilt and usually by maladaptive efforts that only bring further defeat.

We accept as axiomatic that there are no two persons in the world alike. So, while as psychologists and sociologists we have come to discern common patterns of adjustment, we also realize that each person has his own unique version of these common patterns. Such uniqueness is based partly in our genetic inheritance, partly in the long array of successes and failures in making adjustments in the past. In order to particularize, let us examine the behavior of two boys as they seek to maintain equilibrium in a social group, each in his own fashion.

John went with his class and teacher one Spring day across the neighboring fields to gather specimens for their aquarium. The children clustered along the bank of a stream seeking to catch the prized crayfish. Only the nimble fingered had occasional successes. John, clumsy of body and slow in reaction time, after five minutes of no success turned to the teacher and said, "Don't you think it would be a good idea if I gathered some moss and leaves to line the baskets we are going to carry these crayfish in?" The teacher nodded approval of this suggestion and John, accompanied by a half dozen others, set happily about the task. In other sections of the teacher's record about John, we find him holding the tape for racing matches or refereeing a game.

We see in this behavior John's strong need to affiliate, to be a part of the group by making a contribution to it and by having that contribution recognized. There is also the rather grim specific expectancy that all ten-year-old boys will be competent athletically. John cannot attempt to meet this expectancy without continual failure. However, he faces the broader expectancy of the group, that of being a loyal, helpful member, and we would say he is adjusting well to peer-group expectancies. In a sense this has been easy for John. His parents would rather have him for their son than any other boy they could imagine. He has had many successes in his short life. His parents had waited for his readinesses in his early training experiences. They left him free to make more and more of his own decisions as he grew into the period of relative independency of childhood. He was continually assured of their love and support. The adjustments he was making in his peer group were leading him to further social competency and to that sense of personal worth that accompanies growth and integration.

Harrison is different. He is not merely Harrison, but Harrison Parkhurst Graham, Jr. His father has been a very successful man. They live in a well-to-do suburban community. Harrison is also ten years old. The parents are worried about him. The teacher tells about this concern in some notes on conferences with Harrison's parents:

> November. Talked with the father and mother at open-house night. Both are concerned about Harrison's not concentrating very well and not doing better work. They said that they were glad that he had been separated from a boy who had been a special friend last year. They felt the other boy was not a good influence on him. They would appreciate anything that would help to make Harrison apply himself better. They are concerned about his not liking arithmetic. The father said he didn't know what to do with him at times.
>
> December. I talked with the mother at a P.-T. A. meeting. She asked how Harrison was getting along. I replied that he was improving in application and in arithmetic. I had included a note on his report card that he was improving in arithmetic. She said she wondered if he really was improving or if I was trying to make them feel better.
>
> February. One of the teachers mentioned that she had heard that the mother was sorry now that Harrison had been separated from his special friend as he did not seem to be establishing any new friendships whereas the boy in the other room is.

Harrison's parents were not the only ones concerned about him. His teacher was, too. It was not that he was ever impudent, openly hostile, or sullen. On the contrary, he is described as "a good-looking boy who is always good-natured." Moreover, "He smiles a lot and is friendly. He often tells me things that happen outside of school." *But he never did anything that the teacher asked him or the class to do,* at least not at the time it was expected. Following is a summary of the teacher's impressions of Harrison three weeks after he joined the class.

> I noticed that he roamed around the room often. He would go to the

pencil sharpener, perhaps empty it; take a piece of crumpled paper to the waste basket; go to the library table or the exhibit table. At the exhibit table he would look at the same things day after day. While going to and from the room he would often stop at a friend's desk, whisper to him, and then go on. Sometimes the friend would smile at him, then look at me, and go on with his work. Usually the class ignored Harrison's wandering. At times he would walk by a child's desk and just stand and smile or touch a shoulder and then go back to his desk.

In getting ready to work he would often keep the top of his desk up, propping his head against it. He would sit that way until I spoke to him. He was slow getting ready to work after he put his books on the desk. He would look at other pages and, long after I gave directions, he would call out, "What page?" After he did start to work it would not be long before he was just sitting.

It was not that Harrison was dull or stupid. His intelligence quotient on several tests ranged around 115, about average for his class group. And, strangely enough, most of his scores on standard achievement tests placed him at least one grade above his actual grade level. Further, even to the casual observer, he was a robust, healthy boy, and the health records confirmed this impression. The teacher was baffled. He was a friendly person and responded to Harrison's friendliness. But because he valued achievement in the tasks he set for the children, he set about the job of getting Harrison to conform to the standards in which he believed. The degree of success may be judged from the following excerpts from the behavior journal he was keeping about Harrison:

> November 20. Arithmetic period at 11:00. Not working, head down on desk. Looked at page. Moved head and stared down at floor. Opened desk and kept top up with his head propped against it (others working). Sat and stared at book in desk. Moved head back and forth. At 11:04 I told him to do his work. He closed his desk, picked up his pencil, started to write, stopped, and said, "I don't know what I'm supposed to do." I showed him. He said, "Oh, yes, now I know." He started to work. At 11:07 he was looking around, shrugging his shoulders, making sounds; then he put his head on one arm and from this angle wrote something on a piece of paper. Sat up and looked at the book, stared at it for a long time. At 11:09 he began to work. . . . .
>
> November 24. No preparation for social studies. He tried to get his work done after we started class discussion. I told him to put it away. He did for a while but soon had it out again working on it. I told him to put it away. He did. . . . .
>
> November 27. . . . . After a study period, Harrison was called on to answer a question which had been on the board. He said, "I didn't understand it."

I said, "Why didn't you come and ask for help?" He looked at me; did not say anything. I said, "You haven't prepared your assignment." He just looked.

December 1. Pupils giving reports in social studies. . . . . At 9:30 Harrison picked up a sheet of paper which was on his desk. Held it to the light. Put it down and started making dots and then lines connecting them. Kept putting up desk lid or revolving his desk or drawing dots and lines. He was quiet and no one was paying any attention to him. At 9:35 he turned around and motioned to the girl behind him to look at his pencil. She looked away. He turned back, took out scissors, started to cut on pencil, put scissors back, got out a rubber band, played with it, stretching it, putting it across his eyes. . . . I walked over and took it away. I said nothing. He said nothing. . . .

Thus the story of Harrison went on week after week. The teacher pressing for conformity and achievement; Harrison passive, amiable but resisting. Then one day in January a different behavioral pattern appeared.

January 16. At noon in hall getting wraps from lockers. Pupils usually talk and are rather free but have been cautioned about loud talking and fooling around. I heard a lot of noise and found Harrison down on floor sitting on his lockermate, punching him, and shouting. I told him to go sit down in his seat and wait for me. In a minute or two I stepped into the room and found Harrison not in his seat but on the other side of the room doing funny antics before the half dozen children who stayed for their lunch. I was rather disguted that he was not quiet and in his seat and said, "What's the matter with you?" He said, "I just don't like my name. I just don't like it."

The teacher scolded him and sent him home. But in the space of these few minutes Harrison's passive-resistant pattern of adjustment had given way to one of direct aggression or assertion. He had been aggressive toward his lockermate. He had asserted himself with his teacher by not taking his seat, and he had (probably since other facts in his record bear this out) expressed some aggression toward his father. He did not want to be Harrison Parkhurst Graham, *Jr.*

When Harrison returned to school that afternoon he was rather subdued, rather more pleasant even than usual to the teacher. And, for the most part, his record for the rest of the year revealed the old pattern of amiable nonconformance. There were occasional flare-ups with the boys but not with adults. The last entry in the journal sounds very much like the first:

April 28. At 1:40 he had an assignment to do. He was twisting around in his seat, turning the revolving seat back and forth. He turned and whispered to the girl behind him. She was working and did not answer him. I

> told him to get to work. He said, "I don't know what to do." (Everybody working.) I said, "That is because you did not follow our discussion and directions." I pointed to the place for him to study. He looked at the page for a while, but soon stopped, looked around, squirmed, turned to girl behind him. I heard him say something and saw her show him the page. He turned around and started to write. . . . .

We have stated that personal and social adjustments are made within the matrix of the individual's desires and the desires and purposes of his social world. What, then, are Harrison's purposes? If he could tell us, and he probably could not, they would, we hypothesize, include the following:

> I want to be loved just for myself. I hate to bargain for this love and support by offering achievement in exchange.
>
> I would like to be assertive and aggressive and sometimes express my hostile feelings, but it is dangerous because I may lose the friendliness and support that I now have. And to express such feeling directly makes me feel guilty and anxious.
>
> I want to get even, to deprive "them" of something, and I find I can if I am pleasant but don't do what I am supposed to do.

And what are the expectancies and pressures of his environment? There is the overwhelming demand for achievement. In this upper-middle-class home with a father who had achieved brilliantly, there was the deep desire that their son would also achieve and have the same "good way of life." What if he failed more and more in school and eventually became a common laborer? The idea was abhorrent. But there was also the expectancy in this home that he was not capable, that he would fail. The father said he didn't know what to do with him at times; the mother wondered if he really was improving or was the teacher trying to make them feel better by telling them that he was; his mother was glad that he had been separated from a former friend and then sorry because she was afraid he could not make any new ones.

The teacher, too, made demands for achievement. He found he could keep Harrison working if he stood by and urged. But when the boy became briefly aggressive, he saw only a new problem emerging in addition to the others.

In this array of conflicting purposes, Harrison is striving to adjust, to maintain a balance. In his pattern of amiable passive resistance he is satisfying some of his needs but actually is defeating some of his most basic ones. It is essentially a maladaptive adjustment that will interfere with further personal and social growth.

ADJUSTMENT IS LEARNED IN THE CONTEXT OF INTERPERSONAL RELATIONSHIPS

The techniques and the objectives of social and personal adjustment are learned in intimate, interpersonal situations. The mother teaches the young child the techniques of eating properly and controlling his bowels. His mother and, to a lesser degree, his father teach him to control his personal impulses. The neighbor's children teach him to play games and show him how to live in a community of children. His teacher tells him about reading and writing and drawing and shows him how to behave in the school. In later life he is taught how to get and keep a job by a succession of employers. Thus, a vast amount of the individual's learning takes place within the context of interpersonal relationships. The importance of this fact lies less in the skills that he either does or does not learn than it does in the things which he learns about himself and other people while he is learning the techniques and skills. For, in each of these learning situations, not skills alone but also the emotions of people are involved. Each of the interpersonal learning situations is emotionally toned, and each person in it has a personal investment. The mother is worried that her child will not learn as rapidly as her sister's child. Perhaps she feels competitive with her sister and wants everything that she herself does to turn out better. Just as she wants her hats to be more attractive and her husband to be more successful, so her child must learn more rapidly. Therefore, she is a little jittery while teaching her child to hold his spoon and hurries him unduly when he is learning to walk without holding her hand for support. The child himself is anxious to do as his mother tells him, because he is dependent upon her and upon her love and affection. But everything he does seems to be insufficient. His mother feels he doesn't do it fast enough or quite right. She feels thus because she does not judge her child's actions in relation to the child himself, but rather in relation to her ideas of how fast her sister's child learns and of how nice it would be if her own child were only faster. Consequently, in the situation where nothing he does can be quite right, the child begins to wonder. He tries to learn because he loves his mother but finds that she is never really satisfied with his learning. Perhaps, then, she is not satisfied with him, perhaps she does not love him. Thus, since the learning seems so important to his mother and since he wants her to love him, he must begin to think about his learning of these elementary habits in terms of both learning skills and earning love.

The child learns, therefore, not only a series of specific tasks but also a way of relating himself to people, a way of social and personal adjustment.

Consider again the child out for a walk with his mother. He sees a large dog ahead of him and, in a burst of enthusiastic friendliness, runs up to pet the dog. While he is on his way his mother cautions, "Be careful, the dog may bite you." Later in their walk the child sees a grassy slope and decides it would be fun to run down it at full speed. His mother, again sensing possible dangers, cautions, "Watch out that you don't fall and hurt yourself." The mother is quite justifiably trying to teach her child that some dogs bite and that running down slippery slopes may lead to injury. It is probable that in these and subsequent similar episodes she will teach her child these things. But she is also teaching him some other things, some things that she probably does not realize she is teaching him. The generalizations that the child probably makes from these experiences are:

1. That spontaneous enthusiasm (dashing up to be friendly with a strange dog, running gleefully down grassy slopes) is not right and should be checked.
2. That one should not be enthusiastic and impulsive in front of women.

Again he has learned a series of ways of adjusting himself to people and of inhibiting his spontaneous feelings, a mode of personal-social adjustment.

When a girl reaches the age where dating boys becomes appropriate, she has a new kind of personal-social adjustment to make, a new way of behaving in a heterosexual social life. On the occasion of her first evening date, she goes on her date with her mother's admonition in mind, "A girl's best protection is a sense of shame." She embarks on a new area of adjustment already having in mind the feeling that there is something potentially wrong about her dating boys. In her subsequent experiences with dates and with her mother's subsequent similar warnings, she learns how to behave on a date. And she also learns a mode of social adjustment, one mediated by the uneasy feeling that somewhere danger lurks in the enjoyment that she gains from these dates. Certainly her social adjustment and the things that she learned from her early dates with boys would have been quite different had her mother felt less apprehension.

Thus, every interpersonal situation, particularly during the early years of the individual's life, is one in which some mode of social and personal adjustment is learned. And in each of these situations, several kinds of things are learned.

First, there are the specific skills of social living which the adult is trying to teach the child—bowel control, how to hold a spoon, the way to cross streets safely, and, later on, the way to answer the telephone, how to dress for a date, how to treat your relatives, how to read, to add, and to write a theme.

Second, there is a general sense of what behavior is right and what is wrong. Out of the experiences of early childhood training, for example, the child also learns that to disobey is wrong, that one must do as adults tell you, that to be aggressive and express your feelings directly is wrong, that being polite is good, and that you must not talk back to adults but that you can to other children.

Third, there is a series of generalizations about the nature of yourself as a person and about the nature of people around you. Out of all of these experiences, the individual distills an image deep within himself of the kind of person he is—I am a good and successful person; I am an unworthy person whom nobody really likes; I am a person who must learn things or people won't like me; I am a worthless and guilty person who must atone for my guilt; I am a free and impulsive person who does just as he pleases; and so forth. Similarly, he generalizes from his experiences as to the nature of people other than himself and of the world around him. Thus, he concludes the world is a pleasing and satisfying place that gives him what he wants or that it is a displeasing place that deprives him of privileges and keeps things from him; or that men are harsh and domineering people; or that the only way to get things from people is to bargain with them, or to cajole them, or to order them about, or to be exceedingly pleasant and subservient to them.

Such generalizations as these form the guide lines to the individual's social and personal adjustment. Each of these learning experiences takes place within the context of an interpersonal relation. It is because of this relationship that the individual's experiences with people are so crucial to his learning adequate social and personal adjustment. Perhaps this is true because of the exceeding dependence upon people that characterizes the child's first learning experiences. Whatever else a child may learn during his earliest years, he learns especially that his salvation is dependent upon people. The person who most frequently teaches him this is, of course, his mother. The child's first learning experience in a world unknown to him is that his mother is the prime source of his satisfaction and dissatisfaction and that his relation with her determines the nature and the quantity of these satisfactions. That this relationship and others during his earliest years are satisfying ones is, while no guarantee, at least a strong indication that subsequent social and personal adjustment tasks will be learned with readiness and without fear and apprehension. The importance of these early personal relationships lies in the base of confidence and stability that they give to the child. The major requirements of the child's experiences during these early years are two: a sound affectional tie to the parent of the opposite sex established early in life, and a sound feeling of identification with the same-sex parent which is finally established, usually, in the middle-childhood years.

The first of these is of importance in that it gives to the child a basic security, a feeling of being loved and approved, and a sense of certainty with the opposite sex. The second is important in that it aids the child in knowing the significance of his own sex and in learning the social behaviors, values, and techniques of adaptation that are socially appropriate to that sex.

Variations in the nature of these early relationships frequently produce in the child certain feelings about himself and the world around him that color and often distort his perception and learning of subsequent social adjustment. Several not infrequent interferences with these early identifications and their probable effects are the following:

(*a*) *The overly strict parents.* The child of the overly conscientious and strict parents most frequently becomes terrified of right and wrong. Thus, his subsequent experiences are viewed to an unusual degree with an eye to rightness and wrongness. Such a child can accept control and authority only on the basis of fear and apprehension. His social adjustment becomes handicapped by his nagging fear that he will do wrong, thus greatly limiting his possibilities of a lively experimentation with social realities and placing an artificial ceiling on the scope and depth of his adjustment to the social world.

(*b*) *The inconsistent parents.* The child whose parents vacillate in their instructions and in the things which they punish or reward most frequently develops a bargaining conscience. He tends to view subsequent experiences in terms of how he can manipulate them and is generally skeptical of the sincerity of other people. Thus, he approaches each new learning task with the questions in mind, "How necessary is it that I learn this? How can I get around it?" He tends to be the child who will bargain for good behavior, exchanging it for demonstrations of love or other more tangible rewards.

(*c*) *The overindulgent parents.* The child of parents who indulge his every whim and who provide very few limitations upon his behavior tends to have a very confused picture in his mind of the necessity of adjusting to other people. He tends to be hard to live with and he views each new learning task as a nuisance and an unnecessary infringement upon his independence. These children often find it particularly difficult to concentrate their energies on a learning situation, since their previous experience has lead them to believe that time and a winsome smile is all that is necessary to dissolve a demand made upon them or to turn a threat into an affectionate promise.

(*d*) *The clinging mother.* The child whose mother is excessively dependent upon him and who gains the majority of her emotional satisfactions through his successes tends to have difficulty breaking his reciprocal dependence on her and forming a satisfactory identification with his father. Thus, his future adjustment is slanted by a dependence on women and a difficulty in relating to men on a coequal basis.

(*e*) *The brusk, aggressive father.* The child whose father is embarrassed by emotion and who treats his child in a brusk and assertive fashion has difficulty in forming an identification with his father and resultant trouble in learning sex-appropriate social behavior. Further, he is forced to cling to his mother or to seek sources of satisfaction outside the home. Both of these alternatives make his adjustment to the peer society difficult and reduce the confidence with which he can face new experiences.

The importance of these early learning experiences is the fact that basic attitudes toward human relationships in later life are begun at this time and are patterned after the feelings and attitudes which develop from these experiences. This effect of early adjustment experiences does not mean that the adult adjustment is but a duplicate and a repetition of the childhood experiences. It implies only that the modes of adjustment learned earliest seem to be those learned most thoroughly. Henceforth, there is a strong tendency for the individual to react to subsequent experiences and to make his adolescent social adjustment much in the same manner as he has made his childhood adjustment. Thus, a young woman shows, in her relationship to her husband, the clinging attitude which she assumed toward a dominant mother. This does not mean that the husband represents the mother, but rather that the girl, probably full of anxiety, is reacting to new life experiences with her husband in much the same manner as she reacted to them with her mother. Her clinging attitude is an attitude toward adjusting to many life experiences, not simply an attitude toward her mother. It is a technique of allaying anxiety that she developed in childhood and found to be effective. She will, therefore, continue to use it when confronted with other anxiety-producing situations. Thus it is that the early relationships of the child with the parents mold the basic desires and purposes of adjustment and the techniques of adjustment. This basic personality serves as the groundwork and gives the basic direction to the modes of social and personal adjustment in later life.

FRAMEWORKS OF ADJUSTMENT

Adjustment and the elaboration of personality is by no means fixed with these early experiences. In a general sense the possibilities for subsequent learning experiences are myriad. There is a vast range of values, attitudes, experiences, and kinds of people potentially available to the individual. It is conceivable that the child or adolescent might, from any of a number of possible experiences, learn modes of adjustment that would be completely contradictory to those learned during his earliest years. But in reality, the possibilities of adjustment for a given individual are far more limited than this. They are limited by three major areas of life experiences and by the fact that within each of these areas are certain stable and repeated guide lines that tend to give consistency to the developing individual. The first of these frameworks for adjustment is the presence of a consistent and repeated patterning of beliefs, values, expectancies, and pressures that characterize the social group in which the individual grows and matures. The second of these frameworks is an internal one, a concept of the self. As the child grows, experiences life around him, and draws generalizations from the experiences, he develops for himself an internal guide to behavior. The third framework is the presence of a developmental sequence of adjustment tasks that seems generally similar for all individuals. Each of these frameworks, while still permitting great individuality, tends toward consistency and stability for all individuals within a given social group.

The Expectancies of the Social Group

Adjustment is already partially defined and limited for the individual by the particular social group in which he develops. The range of possible behaviors and values that he may develop is limited by those which his social group feel are appropriate. These behaviors and modes of adjustment are encouraged. The group tends to punish variation from these behaviors or failure to adopt them. But each social group tends, within certain limits, to have a pattern of appropriate behavior which is different from the pattern of behavior thought appropriate by another group. Further, they tend to feel that the behaviors of the different group are inappropriate and often even improper. Thus, middle-class parents and teachers (teachers are middle class almost 100 per cent), trained in middle-class ways, teach their children not only that the behavior sponsored by this group is correct but also that people who behave differently are improper and less desirable.

The distinction between social-class groups in American society is one to which these differences in appropriate and inappropriate behavior are particularly relevant. The differences between the training demands of the lower-class parent and those of the lower-middle-class parent are particularly clear. Thus, as Allison Davis[1] points out, in the lower-middle class,

> Parents exert a strenuous and unrelenting push to motivate their children to study their lessons, to repress aggression at school, to inhibit sexual impulses, to avoid lower-class playmates, to attend Sunday School regularly, to avoid cabarets, beer parlors, pool parlors, and gambling houses. They keep steadily before the child, often in the face of economic disaster, the status goals of a "nice" play group and social clique, a high-school education, skilled or white-collar occupation, and a "good" middle-class marriage.
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> In lower-class white or Negro society, on the other hand, a child lives in a different cultural environment; he is surrounded by people who have habits quite different from those of the lower-middle class, and who make other demands and set different goals before him. Among lower-class urban *whites* in the South, for example, extramarital partnerships are common for both husband and wife; separations are the rule; fighting, shooting, cutting, gambling, and frequently magic are accepted classways; church and lodge participations scarcely exist. With regard to sex, education, occupation, recreation, and marriage, the goals which the lower-class family, white or Negro, sets before the child are basically unlike those in the lower-middle-class family. This difference is greatest in those areas of behavior which middle-class society most strongly controls, i.e., aggression, sex responses, and property rights.
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> As the middle-class child grows older, the effective rewards in maintaining learning are increasingly those of status; they are associated with the prestige of middle- or upper-class rank and culture. The class goals in education, occupation, and status are made to appear real, valuable, and certain to him because he actually begins to experience in his school, clique, and family life some of the prestige responses. The lower-class child, however, *learns* by *not* being rewarded in these prestige relationships that the middle-class goals and gains are neither likely nor desirable for one in his position. He discovers by trial-and-error learning that he is not going to be rewarded in terms of these

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[1] Allison Davis, "American Status Systems and the Socialization of the Child," *American Sociological Review,* VI (1941), 345-54.

long-range, status goals, if he is a "good little boy," if he avoids the sexual and recreational exploration available to him in his lower-class environment, or if he studies his lessons. In this learning, he is often more realistic than his teacher, if one judges by the actual cultural role which the society affords him.

Each parent teaches his child the concept of social adjustment that he feels is appropriate and that his social group will approve. For any given social group, proper social and personal adjustment consists of the behaviors thought appropriate by that group. Any other behaviors, to them, mean maladjustment. The child who behaves according to his group's concept of proper adjustment is rewarded. The child who deviates is punished, either by withdrawal of love, by lessened prestige, or by being treated as though he were an improper person.

Thus, this first framework of social pressures and expectancies defines the direction of proper social adjustment for a given individual and delimits the possible range of behavior for which he may be rewarded and praised.

The Development and Organization of the Self

Soon in the child's development a second framework begins to enter—the child's concept of himself and his methods and techniques of adjusting in problem situations. It has already been observed that the child begins to draw generalizations from his experiences, generalizations that apply not only to a specific episode but also to many episodes of similar type. As these generalizations increase in number and in strength, they begin to take priority over new experience. That is, the individual tends less and less to attempt to draw new generalizations from each experience but rather to consider each situation from the point of view of an already formed generalization about that category of experience. An important aspect of these generalizations is the feeling of success or of failure that accompanies them. Each generalization has two parts, one dealing with the world of people and objects about the individual and one dealing with the relation of this world to the individual himself. The individual might conclude that "the world is a place of difficulties and unloving people" and that he himself is a person "who fails and is unloved." Such a concept of self and of the world directs the experience of the individual and will bias his reactions to subsequent events. A child who has developed the self concept, "I am a person who fails," will view each new experience not as a challenge and possibility for new learning, but as another difficult task where the bitterness of failure may again plague him. Such a child can hardly be expected to show much enthusiasm for learning in school or for extending his social contacts. Similarly, a child whose experiences have all convinced him that the way to succeed is to be a child who always "gets there first" will view each new situation primarily as an opportunity to prove his skill and to win again. Each succeeding year adds substance and conviction to the individual's concept of self and thus serves as a framework guiding and setting limits for his social and personal adjustment.

Each succeeding year also finds the individual turning more and more to certain patterns of adjustment and using others less and less frequently. Probably the individual who has had many satisfactions in mastering problems of adjustment will be more likely to attack directly new tasks set for him. He can see the task rather clearly and can marshall his energy and skills to work through the problem to a solution. John was doing this when he gathered some followers and lined the baskets with moss for the crayfish. John, as we pointed out, wanted real affiliation with his peers and the respect of his teacher. He moved directly toward these goals.

There are some important problems in everyone's life which do not permit direct solution. Either they are too much for anyone to solve or, because of the individual's life story of successes and failures, they seem too difficult for him to deal with directly. In this case, we substitute other activities to alleviate the feelings of tension and unbalance that follow frustration. Some of these are substitute behaviors that we use more or less consciously. Some children and adults move into some purposeful activity such as scrubbing the kitchen from floor to ceiling, or joining in a hard-played, competitive game. Others, like Harrison, go into an action pattern which is not purposeful. Rather, it is characterized by aimless wandering, restless movements that serve to drain off energy but leave the individual with little sense of substitute satisfaction so that the restless-movement pattern must be kept going. Other substitute behaviors are of a self-comforting nature. We may overeat or oversleep, buy a new hat or get a new hairdo, swear under our breath at the object of our frustration or at some innocent bystander, suck our thumb or masturbate, or have recourse to humor and joking, and so release our tensions in safer channels.

Finally there is recourse to deeply unconscious mechanisms of defense.[2] Some of the common ones are:

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[2] Norman Cameron, "*The Psychology of Behavior Disorders*, chap. vi. New York: Houghton Mifflin Co., 1947.

(*a*) Regression, where the individual retreats to an earlier pattern of behavior in which he previously met some success.
(*b*) Compensation, where the individual denies the importance of something he really wants by furious activity in another area.
(*c*) Illness may be offered as an excuse for inaction where there is no physical cause. The individual really feels ill.
(*d*) Projection or blaming another person or set of conditions for one's own failures.
(*e*) Overemphasizing a denial of one's intolerable feelings such as acting out a pattern of strong affection when there are strong feelings of hostility which the individual cannot tolerate (called reaction formation).

We all have recourse from time to time to these defensive mechanisms just as we resort to comforting devices or substitute-action patterns. It would probably be impossible to live in our complex society without such substitutes for direct action, but the individual who spends all or most of his energy in such behavior has no energy left to devote to growth toward greater social and emotional maturity. The ultimate purpose of all schools of therapy is to help the patient uncover his problems and to deal with them effectively in real life situations. Probably this should also be the goal of our teaching and guidance of the great mass of children whom we think of as "normal" but who must face the many complex developmental problems of growing up.

Developmental Sequences of Adjustment Tasks

While every individual has unique problems to face and to solve, such as loss through death of a loved person, accidents or injuries to his person, and various kinds of more or less traumatizing experiences, the great majority of his adjustments are to tasks that are common to all members of his social group. These we are calling "developmental tasks."[3] These tasks are set by the expectancies of the social group in which the individual functions and by the processes of growth and maturation of his body. Sometimes the cultural expectancies predominate and sometimes the physical changes predominate in setting these tasks. Most often both are operating together. Take for example the task of making a heterosexual social adjustment in the stage of early adolescence. There are physical and biochemical changes taking place in the body that propel the individual to seek new kinds of interpersonal relations. If this individual is a boy, he will begin to seek out girls. At first his approaches are gauche and usually include pushing and shoving and loud talk which often seems senseless to an adult. But the social pressures, both from the adult world and from the peer group, demand a patterned way of behaving toward the other sex when we become sexually mature. New manners that are appropriate must be learned, and skills such as dancing or game-playing that are important in solving such a task must also be acquired.

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[3] Robert J. Havighurst, *Developmental Tasks and Education*. Chicago: University of Chicago Press, 1948.

One of the conditions that makes developmental tasks difficult of mastery is that children vary so widely in the chronological age at which the various physiological events take place.[4, 5] In most eighth-grade classrooms over the United States, one would expect to find a physiological age range of some seven years. Some will be postpubertal; these will be mostly girls since, on the average, girls reach puberty one and a half to two years before boys do. Some, mostly boys, will still be operating physiologically at the childhood level, and probably the majority at the various stages of physical change that precede puberty. On the other hand, in American society there is an overwhelming tendency to set up expectancies for our children in terms of chronological age and to disregard biological time altogether. One of the characteristics of most developmental tasks is that there is a time in the individual's life which is optimum for mastery of particular tasks. This time is when the body has appropriately matured.

At this point, it may be well to examine some of the more important tasks which face each individual during the various phases of development. (The following should not be considered a complete list, but rather illustrative only.)

Some Developmental Tasks of Infancy. This is the period from birth to the ages of two to three years. The individual has mastered independent locomotion, can communicate and understand some simple concepts, and has a fairly clear sense of selfhood as he emerges from this stage of development.

Establishing the fact and feeling of security that comes from experiencing love and affection is probably the most important task of this period. Even though during the later part of this stage the infant

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[4] Herbert R. Stolz, Mary C. Jones, and Judith Chaffey, "The Junior High School Age," *University High School Journal,* XV (January, 1937), 63-72.

[5] Caroline Tryon, "The Adolescent Peer Culture," *Adolescence,* chap. xii. Forty-third Yearbook of the National Society for the Study of Education, Part I. Chicago: University of Chicago Press, 1944.

must begin to adjust to some rules and regulations, such as not touching the kitchen knives or not going by himself beyond the garden gate, these rules should not be learned through withdrawal of the mother's love and support. The wise mother puts the knives out of reach and keeps a close eye on the baby and the garden gate. Many of those children "with problems" who land on the school's doorstep each September are the children who never achieved this feeling of security, of being wanted just because they were themselves. Probably the basic difference, in the contrasting behavior of John and Harrison in their efforts to adjust to the expectancies of their fifth year in school, might well reside in John's early success in achieving feelings of security and in Harrison's failure ever to be quite sure he was loved for just being himself.

Another array of tasks for the infant is adjusting his physiological processes to social expectancies. He must learn to confine his excretory functions to a certain place and time. Further he must learn to take solid foods and to eat them at a certain time and in a certain way—with a spoon if his family is middle class, with his hands probably if he is lower class. In all of these adjustments of his physiological functioning to regulation, the young child is giving up something, the immediate satisfaction of his impulses. If the training is gentle and his successes rewarded with approval, it is probable that the child will emerge from this first stage of development with a desire for further learning. The approval and satisfaction which the mother shows is a good substitute for simple impulse gratification.

Another important task in the period of infancy is the first mastery of two-way communication. Even before he can talk he has found ways of communicating his feelings, smiling and bouncing about in his crib when someone approaches whom he is glad to see, crying when he is in discomfort. It is probably important that he learns to communicate feelings as well as concepts in his first use of verbal symbols, which usually begins early in his second year.

Some Developmental Tasks of Early Childhood. Most children enter this stage of development at about two or three years of age, but some are earlier, some are later. The developmental tasks of this period are usually finished, for the successful ones, at about the ages of five, six, or seven. But the majority of children are still working on these tasks when they enter kindergarten or first grade.

One of the tasks of this period is learning to identify himself with the adults in his small social world. Physically the child is less dependent on adults, but he remains emotionally closely tied to them.

His play is marked by imaginative role-taking in which he becomes the milkman, the postman, the truck driver. The boy may for some time explore female roles, such as the mother wheeling her baby, the housewife, the cook. The girl, likewise, will explore male roles. But toward the end of this stage we find children of each sex playing mainly at roles pertaining to their own sex.

When they come to school for the first time the teacher becomes a substitute for the father and the mother. He is the central figure in the new social situation, and the child must adjust to the more impersonal attention which he can give one pupil in the larger group of thirty or forty children.

This is the period of life in which the conscience is developed. At first, children usually can only obey rules if the person in authority is there, present in the flesh. Only later in this same stage is a true conscience developed where the rules are internalized and one behaves according to the rules in the absence of authority. When they come to school most children are still involved in this task. Probably one of the ways in which we confuse children most in their efforts to grasp and abide by an ethical system is that we confuse morals and manners for them, particularly in middle-class society. We scold or punish in very much the same way when Henry upsets his glass of milk as when he slaps Bob over the head with his ruler.

It is in this period, too, when children take their first steps toward mastery of their appropriate sex role. The little girl may love her father and receive affection from him in return, but she should want to be like her mother, to find it satisfying to be a girl, a girl who is going to grow up to be a woman like her mother. In our society, particularly our urban society, this is a somewhat more difficult task for the boy than for the girl. Usually his strongest tie as an infant is to his mother who cares for him in his dependency. If he is to move appropriately into his sex role, he must shift his identification to the father or some adult male. But fathers are rather dim figures in our urban communities. What they actually do all day, in offices, industrial plants, and factories, is hard for boys to imagine and only rarely can they observe directly. Further, boys' lives are managed by women —mothers, teachers, maids—who, understandably enough, try to mold the boys' behavior into patterns of adjustment which they themselves as little girls and as adult women have experienced as satisfying and approved.

Another area in which adjustments must be made in early childhood is that of relating one's self to the cosmos. With great reluctance children come to accept the idea of death. Usually they explore the possibilities of death rather gradually—often, first, the death of a pet, of a sibling, of their parents and, last of all, the inevitability of their own death. Usually, at this same time, as most parents and many teachers of primary grades know well, children are questioning the origins of life—how did the baby get into Mommy's stomach or under the cabbage leaf? Many children also explore the problem of infinity at this time—"Where does the sky end?" and "What is on the other side of that?"

Some Developmental Tasks of Late Childhood. This is a period of rather steady physical growth which begins at the approximate ages of five, six, or seven years and ends with the physical and biochemical changes that mark the beginning of the pubescent growth spurt. Girls, since they mature sexually earlier than boys, seem to spend a shorter period of time in this stage of development. Perhaps they actually are ready to move into it earlier than boys, but our generally more protective attitude toward girls may obscure or actually retard such movement. We think of this stage of development as one of relative emotional quiescence, as one of consolidation of earlier gains, as one in which the most tabooed behaviors in our society, sexual behavior and aggressive behavior toward authority, are at a minimum. However, this is the stage of development about which we know least and about which some of our empirical opinions may be deceptive.

One of the important developmental tasks at this time is that of forming a peer-group society of one's own sex in which the codes or value system, the rules and regulations, the punishments and rewards are created and meted out by the children themselves. So it is not just a question of "belonging" to a peer group but of actively participating in its creation and maintenance. Many children are busily at work on this task in the second grade, and the withdrawal of much of their former identification with the teacher may be observed. So also, parents sense a situation from which they are shut off as the child shifts his main active identification to his own-sex peer group.[6]

Another closely related task is the acceptance of the fact that adults are fallible. To the boy or girl in early childhood, adults—the loved parent or teacher—were akin to God. Now, from the perspective of a safe position in the peer group, he can assay the errors, the weaknesses of loved adults. It is usually at this point that he stops revealing all small and large family skeletons-in-the-closet. As he perceives fallibility he becomes protective.

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[6] Barbara Biber, Lois B. Murphy, Louise P. Woodcock, and Irma Black, *Child Life in School: A Study of a Seven-Year-Old Group,* chap. xiii. New York: E. P. Dutton & Co., 1942.

Most children spend much time during later childhood in exploring the realities of the physical world and of learning how to gain greater control over them. The child is "physicist, zöologist, chemist, astronomer, and lots more rolled into one." Out of these experiences the boy or girl achieves a grasp of the concepts of causation, of time, and of distance on a realistic level. Little of this time is spent spontaneously on the social world that lies beyond his peer group and his own immediate family (yet these are the years when most curriculums are heavily weighted with social studies).

Some Developmental Tasks of Early Adolescence. This period begins with the organic changes that mark the beginning of the pubescent growth spurt and ends shortly (usually within a year) after puberty (the establishment of menarche in girls). Its duration for the majority is a period of from two to three years. The average age of onset for girls is about ten years, for boys eleven and a half or twelve.[7, 8] It is a period of great egocentricity. The calm "scientific" observer of late childhood has disappeared.

The boy and girl have now the task of accepting a body that is rapidly taking on the feelings, appearance, and sexual reproductive readiness of the mature adult. As a part of meeting this task the individual works on his or her appearance until he achieves some acceptable physical image of himself. He must learn a new language through which he can express and interpret himself. In a very real sense he has the task of "learning to love himself" before he is free and ready to offer love to others.

Closely related is the task mentioned earlier, that of adjusting to members of the other sex in a new kind of peer society, whose value system, rules, and regulations are quite different from those of the former same-sex peer group. Again the boy or girl must work to create this new order as well as to belong to it.

A third important task of this early adolescent period is that of

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[7] W. W. Greulich, "Physical Changes in Adolescence," *Adolescence,* chap. ii. Forty-third Yearbook of National Society for the Study of Education, Part I. Chicago: University of Chicago Press, 1944.

[8] Herbert R. Stolz and Lois Meek Stolz, "Adolescent Problems Related to Somatic Variations," *Adolescence,* chap. v. Forty-third Yearbook of National Society for the Study of Education, Part I. Chicago: University of Chicago Press, 1945.

establishing independence of adults in all areas of behavior. He must struggle to free himself of his own feelings of dependency upon adults. He must also struggle with the parents' suspicions (especially in the middle class) that he cannot manage his own affairs. There are usually long months when he moves back and forth, at first demanding independence and then, frightened, regressing to a very childish dependency again.[9]

Some Developmental Tasks of Late Adolescence. The period begins usually within a year after puberty is reached and ends when the individual actually assumes roles and responsibilities of young adulthood. Social class differences will again enter to pose many of the tasks in a different fashion for lower- and for middle-class boys and girls. Lower-class children will be hurried through this stage to early jobs and early marriages. Middle-class children will be held back from economic independence and early alliances until they have "completed" an education. It could be characterized as a period of practicing at being adult. Most boys and girls are still in high school during all or a part of this period. The most significant change again is in the patterning of identification. The boy or girl in late adolescence wants to be like adults, and, hence, peer-group relationships take on patterns of adult behavior.

Some of the specific tasks of the period include exploring one's abilities and the economic world to find an appropriate vocation; developing strong attachments to members of the other sex in exploration of what is desirable in a future spouse; exploring value systems in order to find out a workable value system or philosophy of life of one's own.

As we have examined some of the developmental tasks that confront all individuals within our society, the reader may have questioned, "What happens when an individual succeeds at a task, or what happens when he fails?" First, it should be noted that probably few if any of these tasks are mastered in less than six months; more often they are worked on for several years before mastery is achieved. If the individual is successful, these learnings are integrated with past experience and become a very integral part of the personality of the individual and the basis from which to explore and start on next tasks in the developmental series. In this sense we can distinguish between specific learning tasks and development. In the former we also have forgetting. In development we have major changes taking place in personality organization.

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[9] Peter Blos, *The Adolescent Personality*, pp. 223-325. New York: D. Appleton-Century Co., 1941.

Failure on a developmental task has far-reaching effects, too. Failure at one level in a series seriously handicaps future accomplishment of tasks in a related series. For example, if in early childhood the boy fails to identify and accept his sex role, it will be most difficult for him to become a successful member of his own-sex peer group in late childhood; if he has these two failures behind him, the probabilities are very small that he will make good heterosexual adjustment at the later stages of adolescence.

Frequently we find individuals working on developmental tasks on which they have failed many years back. The individual who failed on the series of tasks having to do with achieving independency may in adult life be in a continual battle with authority in whatever form it appears to him—the government, his boss, his wife.

The developmental tasks, then, also limit the array of adjustments which the individual can make. Indeed he is often propelled into facing these definite problems of growing up by the urgency of his own physiology and the demands of his social environment.

The Role of the School in the Personal and Social Adjustment of Children

Most teachers and administrators would subscribe to the statement that good personal-social adjustment is as much the goal of the school as is the acquiring of skills and knowledge for the children. Some would add, "even more so." But if we examine the implications of such a statement, particularly in relation to factors and conditions that make for good adjustment, we realize how enormous the gap is between objectives and practice.

When we discussed adjustment in the opening pages of this chapter, we indicated that each individual has his own unique set of purposes, desires, and needs, and that he finds ways of adjusting that are uniquely his, also. If we are to guide him into experiences that will permit outcomes that are satisfying to him and acceptable to his social environment, we must know him as a unique person. How many schools are prepared to do this at the present time? It can be done,[10] but the number of school systems that are helping their teachers to acquire the necessary skills and knowledge is very few.

We spoke of the expectancies, purposes, and pressures of the social environment. What are these in any particular school? And do they make for mental health, for good adjustment? Few persons among school personnel would know how to go about making such an assay. We spoke of social-class differentials and of the teacher's easier acceptance of children from his own middle-class group. Here, a few dents have been made but mainly through large grants of money from foundations concerned about stresses and strains that arise out of minority-group problems. But things can be done in many small ways that may become significant if the knowledge that the social scientists have been presenting us about American society are absorbed and applied. In one school system in a largely lower-class mill community, a benefactor installed lunchrooms during the depression years of the late 1930's. One school principal, who was informed about our social stratification, decided to invite the children to try using the silverware. Most of them in their homes ate with their hands standing up and reaching into the common pot. He said something like this: "If you go on a trip with your families, you will probably want to know how to use these in the correct way if you eat in restaurants, so let's practice here." In other schools in the same community there were many flare-ups: "You have to eat nicely or leave the dining room." And from the older children, "Well, we don't do that way at home."

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[10] American Council on Education, Commission on Teacher Education, *Helping Teachers Understand Children.* Washington: The Council, 1945.

We have indicated that many basic patterns of adjustment are learned early at home in the context of the family group. What can we do about it? Nothing? It seems to these writers that a good deal of experimentation could be done here. Teachers of primary grades could be key people in a mental-health program in our schools. They have the children when they are still strongly identified with adults, when they reveal their problems readily, when they are still malleable and open to help and change in their adjustment patterns. Parents, too, of this age group are more reachable, more often seeking help and guidance. Of course these teachers would need training in skills and knowledge about mental hygiene and should have much smaller groups to work with as well as the counsel of experts from time to time. But possibilities of reducing the number of problems in later years might be well worth the cost.

Probably really effective courses in family-living, together with group and individual counseling in the later high-school years, might well reap rich rewards in the good adjustment of the next generation of children.

If an individual is making a maladaptive adjustment such as Harrison's aimless wandering and wiggling, is there anything a teacher can do? Again it seems to be a matter of acquiring skills and understandings. In Harrison's one recorded effort to change his passive-resistant pattern of adjustment when he was aggressive toward locker-mate, teacher, and father, the teacher might simply have reflected his feelings,[11, 12] indicating also that he was accepted in this role by some such comment as, "You feel as if you could manage your world today." With such treatment, he might have been stimulated to try again to be assertive. One of the things that Harrison must do if he is to grow and mature emotionally is to learn to assert himself appropriately. All day long the teacher is dealing with emotionally toned activities—hostility, defiance, dependency demands, destruction of property, dishonesty, "crushes," masturbation, passivity, clique cohesiveness, fun-making, "horse-play" euphoria, thumb-sucking, gum-chewing, nose-picking, nail-biting, scratching, competitiveness, and so on. Perhaps one of the best single solutions in dealing with these behaviors is learning the skills of clarifying feelings.

Finally, of what use is the framework of adjustment which we are calling developmental tasks? It is probably safe to estimate that a very high percentage of the free energy each child has available for activity is being expended on these common tasks. They are brought into the classroom whether the teacher says yes or no; they go out again with the children to the playground, and on home again at night. Children work at them constantly. If a more complete array were examined, it would be clearer that these are the stepping stones to social and emotional maturity. Hence, every child, even the most emotionally robust, will need guidance from time to time if he is to evade the scars of failure. However, again it becomes necessary that the teacher learn to recognize from observations of pupil behavior what tasks each child is struggling with in any given week or month or year, since each will go about the job in a different fashion.

Since the developmental tasks on which the child is working have such deep interest for him and are so often marked with strong feeling, they could become important guides in the selection of content for curriculum. It could be hypothecated that a unit on man's struggle for freedom through the ages, including the Magna Charta, the U.S. Bill of Rights, and the U.N. Bill of Human Rights, might be a good

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[11] Carl R. Rogers, *Counseling and Psychotherapy*. New York: Houghton Mifflin Co., 1942.

[12] Virginia Mae Axline, *Play Therapy: The Inner Dynamics of Childhood*. New York: Houghton Mifflin Co., 1947.

unit at about the eighth-grade level when many of the children are working on the developmental task of gaining emotional independence of adults. It would not be simply that the boys and girls might be "interested" (they probably would be) but that the feelings of guilt and anxiety generated by their spasms of rebellion against parents and teachers could find solution as they grew to understand that great and good men fought for freedom.

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CHAPTER VII

HOW CHILDREN LEARN AESTHETIC RESPONSES

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Research in this area is meager and scattering. Nevertheless, it is possible to formulate a number of propositions which can be maintained with considerable confidence and which are practically meaningful.

Aesthetic Responsiveness Is Distinctive and Definable. A great many discussions of the psychology of the arts, and of their appropriate pedagogical and curricular treatment, are vitiated by an extreme vagueness. They center about no clear and explicit conception of what the art experience is. This leads to conclusions infected with mysticism, which are, to say the least, dubious in theory and often mischievous in practice. There is, however, no necessity for this, since the aesthetic response, considered directly as a phenomenon of human behavior, has reasonably clear-cut characteristics. These must be understood before there can be an intelligent approach to the problem of how this type of response is acquired.

Aesthetic response is, precisely, response to the evocative values of organized pattern. The report of the Progressive Education Association on *Language in General Education* (15) draws a distinction between the evocative and referential significance of language. This distinction is fundamental, not only for the literary arts but for art in general. A poem differs from a factual description or an argument or exposition in that, as a matter of deliberate intention, it embodies *and projects evocative or emotional values in the pattern and arrange*ment of its language. A picture differs from a blueprint, a ballet differs from an exhibition of skilled movement such as one might see on an assembly line, and a work of architecture differs from a purely utilitarian structure in precisely the same way. On the one hand we have types of behavior explicitly geared to rational or utilitarian ends. On the other hand we have types of behavior explicitly directed to evocative projection. Music affords the outstanding instance of an intricate, highly articulated structure which has no referential meaning at all, or almost none, and whose significance and value is entirely evocative. The so-called "nonobjective" type of visual art is essentially an attempt to achieve the same thing in another medium—usually with questionable success.

This whole conception of the nature of the aesthetic response is developed and defended by Rusu (**17**). It has numerous far-reaching implications which cannot be treated here, but it seems well to mention a few of them before proceeding: (*a*) The distinction between evocative and referential values is far from mutually exclusive. Most works of art, with the exception of music, are "about" something. Poems, plays, pictures, and ballets usually have a referential content. A cathedral is a place of worship, not merely an abstract design of lines, masses, and colors. What this means is that the domains of art and nonart merge into one another. But the same is true of all psychological and cultural categories; and it is far from destroying the significance or importance of the basic classification. (*b*) The distinction between the fine and the applied arts has no psychological meaning. Whenever we are dealing with evocative projection through the medium of organized pattern, whether in costume design, ceramics, room arrangement, natural scenery, easel painting, poetry, the dance, or music, we have before us the characteristic and recognizable aesthetic response. (*c*) Aesthetic responsiveness manifests itself in three modalities. These are creation, re-creation, and enjoyment; or, to use the terminology of Mueller-Freienfels (**13**), production, reproduction, and enjoyment. The present writer prefers these latter formulations, because of the extreme vagueness of the term "creation." What is meant is the actual fabrication of an original evocative pattern, as in the painting of the picture; the reproduction of such a pattern, as in the performance of music or the acting of a play; and the enjoyment of such a pattern. The essential point is that in all these modalities the characteristic of the aesthetic response remains the same. It is a response to the evocative values or "meanings" of organized design. This is by all means the focal consideration in dealing with the problems of learning and development which arise in the area of the arts.

Children Manifest Distinctive Aesthetic Responsiveness. It seems clear that children of preschool and elementary-school age are entirely capable of distinctive aesthetic responsiveness in the precise sense defined above. Thus, Bulley (5), on the basis of extensive testing which was carried on in England with many thousands of subjects, reports that young children show remarkably valid discrimination in judging the aesthetic quality of objects of visual art. Daniels (7) and Whorley (24) have found that preschool children are sensitive to the factors of compositional balance and compositional unity in visual patterns. Jasper (9) investigated their responsiveness to rhythm in visual form and reached indecisive results. The reason may be either that visual rhythm itself is a somewhat hazy aesthetic category or that the primary responsiveness of the young child is to factors other than rhythm in the visual medium, as it seems to be in the case of music. Voss (23) found that, given simple explanations and a number of contrasting instances of their application, young children quickly learn to evaluate and to respond to organizational factors in a picture as against an attitude toward it as a portrayal. Turning to poetry, Feasy (8) found children's appreciation of poems determined by a wide and varied range of factors. Among these, however, appreciation of language, form, and emotional content were normally prominent; and this emphasis could readily be increased by appropriate suggestions and guidance. Once again, it has long been known that children are extremely responsive to musical stimulation, and that the components of melody and tone quality are peculiarly important, with harmony and rhythm taking a secondary place (14). More than this, children are known to make differential mood responses to varieties of musical patterns. All in all, it seems quite safe to say that the distinctive aesthetic responsiveness is in no sense an artifact, that it appears at least in rudimentary form very early in life, and that it always has the definite character of response to the evocative value of pattern.

From the two propositions just advanced comes the conclusion that all the sequences of learning and growth in and through which aesthetic responsiveness refines and consolidates itself are, so to speak, of an entirely "normal" kind. These processes, as they go on in the area of aesthetic experience, have nothing unique or mysterious about them. Their controlling aspects, and the conditions for their effectiveness or ineffectiveness, are the same here as anywhere else. We can understand them just as completely—or just as incompletely—in this context as in any other. And the reason is that aesthetic responsiveness itself is an entirely normal human process and a basic element in man's psychological equipment, which appears early in his life and continues on. The further propositions here to be formulated will center on this consideration.

The Development of Aesthetic Responsiveness Involves an Orientation of the Personality. This seems a reasonable inference from a number of research studies. There have been a number of investigations of the personality traits of musical persons, the outcomes of which are in substantial agreement (**14**: 350 ff.). Such persons are likely to be physically active, emotional, intellectually versatile with wide literary and artistic interests, imaginative, socially extroverted, with strong vital needs, but not orderly, industrious, or punctual. Similarly Cattell (**6**) has indicated a distinctive trait pattern associated with drawing ability. He finds that such persons tend to be labile, intuitive, and careless as contrasted to habit-bound, logical, and thrifty; sociable, responsive, and hearty as contrasted with thrifty, shy, and aloof; incontinent, gluttonous, and curious as contrasted with inhibited, queasy, and unenquiring; grateful, softhearted, and easygoing as contrasted with thankless, hardhearted, and short-tempered; tough, lethargic, and talkative as contrasted with sensitive, harried, and introspective; alert, energetic, and quick as contrasted with absent-minded, languid, and slow; energetic, self-confident, and debonnaire as contrasted with languid and self-distrusting; responsive, genial, and socially interested as contrasted with aloof, cold-hearted, and brooding.

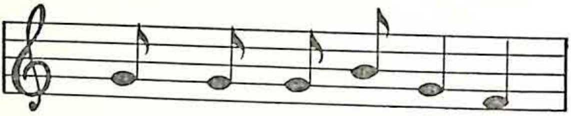
Thus, aesthetic responsiveness must not be considered as an isolated process, unrelated to other personality traits and characteristics. On the contrary, it must be regarded as involving an organization or orientation of the personality. This, in effect, is what Mueller-Freinenfels (**13**) had in mind when he insisted that the greatest inhibiting influence upon any kind of aesthetic responsiveness is an acquired emotional stupidity and insensitivity and that avoidance of this is one of the most important tasks of art education of every kind.

At the same time an attempt such as that made by Read (**16**) to show a direct one-to-one relationship between personality-type and type of art product is certainly open to very grave doubt. Our categories of personality classification are altogether too unstable to make it hopeful to interpret a child's drawings primarily in terms of the kind of person he is and to use this as the basis of his artistic education.

Aesthetic Responsiveness Develops in the Setting of the Total Personality. This would seem to be about as far as we can safely go, and it is, indeed, an idea of great importance. The meaning of the proposition is excellently brought out in Biber's analysis of the development of drawing ability (3).

The child's first true drawings are elements in his widening experience and discoveries, often surprising to him, of what he can do. He moves from the making of lines which he hardly notices, to making careful and deliberate lines, then to spatial compositions, and so to drawing the likenesses of objects, the average age of making a drawing recognizable by adults being a little less than four years. This is the sequence to be expected when there is no deliberate urge toward representational drawing. The transition from mere lines and designs to representation is crucial. It is often said that the child's earliest true drawings are schemata, i.e., that he draws things as he knows them to be and not as he sees them, as for instance drawing two eyes in a profile. But the truth seems to be that drawing is integrated with total development. Before age two what he does is not just childish scribbling but oscillating, large arm-movements with much repetition and little fine control, and with the crayon clutched in the fist. From two to two and a half years of age there is less exploratory activity and more control; less clustering of lines, and more use of the whole paper as a field. New types of line and also the production of enclosed spaces become more prominent, the advance coming both from kinaesthetic refinement and from seeing and noticing what he has done. From age two and a half to three years one may expect the emergence of conscious shape and form, parallels, enclosed lines, etc. By age three the child sees connections between what he has done and pictures in books, and so forth, and comes to name his pictures. By four his drawing—which at about the age of three emerged from the amorphous stream of activity—has become a technique with various definite possibilities, and he attaches a high personal value to his work, e.g., wants to take it home, to show it off. Drawing materials become tools for a special purpose, not objects to be manipulated and played with in random fashion, and the grasp of the crayon has changed from the fist to the fingers. By this time drawing has become one strand in the growing use of symbols.

No such elaborate and careful analysis of the developmental sequence has been presented in connection with the other arts, but there is every reason to believe that the processes are substantially similar. Musical responsiveness, for instance, clearly has its origins very early in life. It seems to begin with a rather undifferentiated but quite insistent mood-wise response to the stimulation of the tonal content. Lewis (11) has made the interesting suggestion that the babbling, lalling, and comfort sounds that become conspicuous from the sixth to the ninth month of life, which are neither speech nor song but the matrix of both, may be of great importance in aesthetic development. He interprets this mode of behavior as the normal pleasurable use of sound, and believes that in it may be discerned the germ of both poetic and musical appreciation. Long before anything like formal instruction begins, music becomes a social instrumentality, and psychologists have called attention to what Stern (**21**) has called the *Urmelodie:*



This is a characteristic melodic fragment which is said to appear spontaneously among children of many different racial cultures. It is marked by an absence of semitone steps, a falling minor third, and the absence of a true tonic, and it appears with all kinds of rhythmic formations and all kinds of words.

Art Education, in All Its Areas, Should Be Conceived as a Shaping Up and Facilitation of These Basic Developmental Sequences. Ames (**1**) has presented an admirable description of what is involved in assisting the development of a child's ability to paint. The child wishes, let us say, to paint a picture of a fire that he has actually seen. The indiscriminate use of violent red seems at first the best way of conveying both the sensory and emotional values. But soon the child discovers that a picture so made might stand for many other things as well—battle or murder, for instance. Thus it becomes necessary for him to use more differentiated and explicit symbols to convey what he wishes to say. He can make clear his intention, perhaps, by having spectators standing around and watching the fire. Here he should be encouraged to consider attentively just how people look when so engaged and to use his medium to put down what he sees. In very much the same way, Sheehy (**20**) has told of the emergence, in the course of three days, of a quite highly structured choric chant, which was achieved by a group of preschool children without any guidance at all.

These two instances may properly be regarded as prototypes of what art education—or, to use the German pedagogical expression, "aesthetic education"—should be in all its phases and at all levels. We are dealing with a basic and definable type of human responsiveness, integrated with everything in the personality. Even if left entirely alone, its development will go forward to a certain point, but it is sure to be limited and almost sure to be distorted. The problem clearly is to shape up and facilitate this process in the light of our understanding of the basic aesthetic responsiveness itself. What is evidently required is continually to stress and, indeed, continually to center upon aesthetic values. Progress in the arts means a progressive strengthening and refinement of responsiveness to the evocative values of expressive pattern. This, indeed, is the basic formula, clearly indicated by everything we know.

It is a curious reflection that, in practice, this formula is best exemplified at the preschool level and at the most advanced levels. The "finished artist," i.e., the person who is supposed to have achieved his technique, usually expects and receives from a coach aesthetic stimulation and reorientation. At the other extreme of the scale, the intelligent teacher dealing with a young child will usually seek first and foremost to evoke and guide his responsiveness to aesthetic values. It is in the area between these extremes that the formula seems to break down, and aesthetic education is transformed into something essentially different, namely, sheer technical drill. That this is enormously wasteful and frustrating cannot for a moment be doubted. Seashore (**19**), for instance, has pointed out very truly that an explicit beginning of the study of musical technique is not necessary before the age of twelve, and that the result will be gain rather than loss so long as this is not interpreted as a policy of mere postponement, and so long as there is intensive musical stimulation and guidance throughout. Similarly, Kwalwasser (**10**) has shown that the earnest and widespread endeavors to teach children to read the musical score in our elementary schools are utterly unrealistic and doomed to the failure they have actually achieved. Yet, the solution to the problem of technique is, in principle, perfectly clear. Skill in any art should be regarded as a refinement of insight, and it should be so treated pedagogically. All technical study should be shaped up as a conscious attempt to clarify and project aesthetic values. In connection with the visual arts, Macomber has shown that a discriminating command of color relationships is far better achieved through a variety of projects requiring the use of color than through the conventional study of the color circle (**12**). And this exemplifies a principle applicable everywhere.

Saunders (**18**) and Updegraff, Heiliger, and Learned (**22**), dealing respectively with music and the visual arts, have shown the remarkable effectiveness of a strong and consistent emphasis upon aesthetic values. When a group of children, rated very low in artistic ability, were given intensive and intelligent help in recognizing and dealing with organizational and expressive values, there was a dramatic improvement in the quality of their pictures. In the same way, groups of children were given intensive help in the expressive use of the singing voice, with very similar results. The general conclusion is that pedagogical practice in these areas is far too superficial and mechanical. Above all, it places far too much emphasis upon technical matters which, in the nature of things, cannot be of more than secondary and instrumental importance and tends to leave the vital issue of aesthetic responsiveness and its promotion to sheer chance.

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CHAPTER VIII

HOW CHILDREN LEARN THE PRINCIPLES AND TECHNIQUES OF PROBLEM-SOLVING

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INTRODUCTORY STATEMENT

How do children learn the principles and techniques of problem-solving? The answer to this question presupposes acceptable answers to two other questions. First, what *is* a problem? Or, what are the essential features of a *problem* situation? Second, what *are* the principles and techniques of problem-solving? If we can identify typical and recurring attitudes, skills, and procedures in problem-solution, we can then inquire into the ways of teaching these attitudes, skills, and procedures to children. This chapter, therefore, breaks up into three parts concerned with the following questions:

1. What is a problem?
2. What do we know about successful techniques for problem-solving?
3. What can teachers do to develop the problem-solving abilities of their students?

WHAT IS A PROBLEM?

Life is a continuous process of adjustment to a changing environment. Even in the most common everyday situations, adjustment to change is occurring all the time. The child who is walking down the sidewalk to the movies sidesteps to avoid a dog lying in his way. He stops at the curb to let a car go by, steps down into the street and up again onto the sidewalk when he reaches the far side. But these changing environmental situations do not represent problems to the child of school age because the habit patterns established through his life history are quite adequate to cope with them. He responds automatically with an habitual reaction, which proves adequate to meet the situation and to permit him to move on toward his objective.

Suppose the child now finds that a street which he must cross is being repaired and is covered with hot, sticky asphalt. Here we have the makings of a problem situation. The essential elements are present. The individual is motivated and oriented toward a particular objective or end result—in this case, the movie theater. We need not inquire into this motivation in detail but should note that the goal here, as in most human behavior, is highly socialized and an end product of much earlier learning. The direct route to the objective is blocked. In this case the blocking is an actual physical obstruction, but often the blocking lies merely in the fact that the individual does not have available any response which will lead him to his goal. The individual must improvise some novel route to his objective, a new route in space or in terms of the patterns of behavior shown by the individual.

Problems are of all levels of complexity, scope, and subtlety. They range from the simple example which we have cited of what to do when a street is blocked to the most abstruse efforts to formulate a scientific theory. But they all have in common the three elements which we have indicated:

1. The individual is oriented toward a particular objective and motivated to reach it. He has an end in view.
2. Progress toward the objective is blocked.
3. Available, habitual response patterns are not adequate to permit the individual to surmount the obstacle and proceed toward his objective.

Does every unsatisfied motive of the individual represent a problem? That depends on how we choose to use the term. For discussion in connection with the work of the school, it is perhaps more fruitful to reserve the term for needs which are recognized by the person in question and ones which point toward a definite end result which will satisfy these needs. Thus, the child who merely feels unhappy without knowing why would not be said to have a problem, even though we might assume that some unsatisfied need lies back of his unhappiness. If this same child should focus his dissatisfactions on lack of companionship with other children and start to direct his efforts toward overcoming that lack, then a definite problem would emerge. As we shall use the term, then, a problem implies not only a condition of need but also identification of that need and anticipation of the end result required to relieve the need.

The distinction which we have tried to draw in the preceding paragraph between a vague state of need and a clearly formulated objective is not a sharp one. There are all degrees of awareness of the end result which will satisfy one's present condition of need, from the vaguest to the most precise. Thus, at one moment a boy may know with the greatest definiteness that he is trying to make a model airplane in accordance with a particular set of plans; at another time he may be vaguely aware that he is bored and looking for something interesting to do. As we shall see presently, one aspect of solving a problem is for the individual to become more sharply and accurately aware of the exact nature of the problem which he faces. But the existence of a problem, as we use the term, implies some awareness of an end to be attained.

From this point of view, the school is as much concerned with creating problems as it is with solving them. One function of education is to help the individual to become aware of worth-while goals and objectives, to create "problems" for him which may serve as a basis for orienting his efforts and his life activities. "Problems" in this sense become almost synonymous with "purposes" and closely related to "interests." They constitute the vitalizing, directing force behind the individual's efforts. A major concern of the teacher should be to provide school experiences which will introduce the pupil to a wide range of problems, the solution of which contributes to satisfactory individual and group living. The efforts to solve these problems, in school and throughout life, make for personal growth and the richness of individual life.

No problem exists, in the sense that we have been using the term, except as it is a problem for a particular individual. It is always an individual who has needs and objectives and an individual who encounters blocking as he progresses toward those objectives. The exercise in the arithmetic book is not a problem, then, until it is accepted by the pupil as such. Only in so far as *his* purposes and objectives are involved does the exercise become a problem to him. In many cases, of course, the pupil accepts the objective as formulated by his teacher or his text as *his* objective and directs his efforts toward formulating a solution. A variety of motives co-operate in making school objectives acceptable objectives for the individual pupil. The satisfactions of being approved and accepted by parents and teacher, of exploring and investigating, of mastering and knowing, and of succeeding are real and effective for many pupils.

But it must always be remembered that there is a gap between the goal which is seen by the teacher and the goal which is set by the pupil. In many cases the gap may become so wide that there is no resemblance at all between the problems which the teacher sees in a particular school situation and the problems which are experienced by the pupil. The eager teacher of social studies who starts out to explore with a class group the problems of making a success of the United Nations and world government may be dealing with a group of pupils whose problems focus around achieving a lasting peace with the gang in the next block or effective social contacts with the girl in the front row. These children may go through the motions of research and discussion of world politics, but the problem which their efforts are directed to solving is how to appease Miss X with a minimum of effort and a minimum of interference with the really important affairs of life.

The educator's initial concern, therefore, must be to know what problems spontaneously present themselves in the lives of children and what resources are available to the schools to make real to the pupil the problems with which an adult society would like him to grapple.

It is perhaps worth while to make a distinction between two types of problems which arise in life, which we may call (*a*) *practical* problems and (*b*) *intellectual* problems. Type (*a*) is motivated by a need to act; type (*b*) by a need to understand. In the practical problem the individual is faced with the necessity of specific, practical action. He must find a way across the tarry street, invent an excuse to tell his mother as he comes home late for dinner, or choose a Christmas present for Aunt Susie. In the intellectual problem, the individual seeks to understand. His need is to know. He wishes to know why the soap is slippery, how an automobile engine works, or what the composition of a spiral nebula is. We must recognize the reality of this latter type of need. It is evidenced by the eternal questioning of the small child, and persists, though perhaps less insistently, as he grows older. It is central to any process of education. An educational program should take balanced account of these two types of needs in the child—his needs to solve practical problems of action and his needs to know and understand. Genuine problems for him arise in both these spheres, and in each he may have experiences in problem-solving. But in either case, the school needs so to present the problems to the child that they serve a need for action or a need for understanding which he accepts as his own.

WHAT ARE THE PRINCIPLES AND TECHNIQUES OF PROBLEM-SOLVING?

Aspects of Problem-solving

As a basis for discussing the complex array of activities which go on within the limits of "problem-solving," it may help if we break up the enterprise into a number of aspects or phases. In doing this, of course, it must be recognized that any fractionation of the process is artificial and that there is an organic unity to the process which suffers in any type of analysis. A familiar analysis, owing its main debt to Dewey,[1] analyses the process into five phases. These phases represent a logical sequence of steps to be carried out in an idealized process of problem solution. The phases may be defined as follows:

1. *Becoming aware of a problem.* The route to some objective is blocked, routine behavior is not directly successful, and the individual realizes that a problem exists.
2. *Clarifying the problem.* The problem, sensed at first only in general terms, is made more sharp and specific in terms of just what end is to be achieved and just what is known or what resources are available.
3. *Proposing hypotheses for solution of the problem.* Specific proposals are suggested and elaborated for dealing with the problem situation.
4. *Reasoning out implications of hypotheses.* Bringing together the hypothesis and the relevant facts which are known to him, the individual reasons out what follows from the hypothesis which he is considering.
5. *Testing the hypothesis against experience.* The conclusions which follow from the hypothesis are tested against known facts or by experiment and the gathering of new facts, to see if the conclusions are valid and the hypothesis is supported.

We must recognize, however, that this is an analysis to help our understanding of the problem-solving enterprise, rather than a description of any individual actually carrying through the solution of a problem. The analysis is neat, logical, and sequential. Actual behavior in response to a problem situation is often confused, illogical, and disorderly. Furthermore, each problem-solver and each problem to be solved has its own individual characteristics. Diversity rather than uniformity is the rule in the attack upon problem situations. We do not find the problem-solver going neatly and logically through the sequence of steps outlined above. Rather, he jumps around, often starting in the middle, returning then to the initial steps, moving back and forth between hypothesis, problem clarification, appraisal of implications, and hypothesis again. Some of the phases outlined may fail to appear, as when a hypothesis is put into action without previously thinking through what it means or implies.

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[1] John Dewey, *How We Think*, pp. 106-15. Boston: D. C. Heath & Co., 1933.

Thus the boy who wishes to get his mother a Christmas present may almost immediately decide that a handbag would be a nice present, and he may set out to the store to buy one. Only then may he find that the cost is more than he has to spend and be thrown back upon the necessity of defining his problem more sharply in terms of the financial limitations to be met. A second choice may be a box of candy, and this may be accepted as a solution until the boy mentions it to his father who calls attention to the fact that the mother is currently engaged in an effort to lose weight. These experiences may bring home to the boy the need of further defining his problem, and he may now start to formulate fairly consciously and clearly the conditions which any solution to his problem must satisfy in terms of cost, his mother's tastes, interests, and preferences, and her present supplies and needs. He may now check each suggestion as it occurs to him against those requirements for a solution and may reject or modify it on the spot.

The point which we have been emphasizing in this example is that problem-solving and reflective thinking do not follow an orderly or a uniform pattern. To take two steps forward, the individual must often take one step backward. To proceed in one direction, he must often start out in another. The biological adaptations of the organism do not follow the precise pattern of the logician, even when adaptation is taking place through the process of reflective thinking. The analysis by phases is a logical analysis of the idealized pattern of problem-solving rather than a psychological description of the behavior of an individual facing a problem. However, the pattern of this idealized problem-solving sequence can serve to structure our discussion and to indicate some of the points at which education can make contact with the process and contribute to its effectiveness. It must be with a clear recognition of these points that we discuss in the following sections the separate phases of problem solution.

Becoming Aware of Problems

Problems arise in the pursuit of individual aims and purposes. The range of problems which the individual encounters, therefore, is a function of the range of experiences which he has had, the range of activities in which he engages, and the range of interests which he develops. The boy who has never seen a radio has had no problem of trying to understand how one works; the "only child," who has had no playmates of his own age, has had no problems of maneuvering another child into doing his will; the girl who "doesn't do arithmetic" escapes the many problems which may be found in algebra or geometry. The narrower a life's experiences, the more limited the problems which it provides. A rich life, rich in experiences and interests, is also rich in problems and in the opportunities to learn by meeting them.

Clarifying a Problem

Any problematic situation involves, in the first place, an objective—a final end result to be achieved; it involves, in the second place, a set of given facts and conditions; it involves, finally, a gap between the given and the desired which must be bridged. It is the bridging of this gap which constitutes problem solution. If the gap is to be bridged, the nature and location of the gap need to be identified accurately. That is, the individual needs a clear formulation of the objective to be achieved, and he needs a full and accurate picture of the known facts, the conditions to be met, and the like.

Consider the case of the high-school Senior trying to decide what he should do after completing school. A sound decision on this point requires thorough clarification on both sides of the gap. What are the objectives which the individual is seeking which are affected by this decision? What is the relative importance of each? What weight is to be given to ultimate earning power? What consideration to immediate financial return? How important is social prestige? How much importance is attached to variety? to adventure? to security and certainty? to social relations with others? On the other hand, what are the facts to which the solution must conform? What are the individual's aptitudes for and skills in different types of study or work? What are his resources for further study? What is known about the conditions of work and the rewards for work of different types? When the student has carefully defined and weighted the objectives which he is seeking and has assembled and organized all the information he can get about himself and about the world of work, he is then in a sound position to propose a plan for his further education or for his entry into the world of work. Needless to say, few pupils go at the process of planning a career in this systematic and consciously directed manner, and, by the same token, many arrive at only inferior or partial solutions to the problem of choosing their life's work.

As the above example indicates, one aspect of problem clarification is that of specifying what is required in a solution. For example, in a science class studying the needs of their community, the problem of the community's unsatisfactory public water supply might be raised. A project might be initiated to plan an improved water supply for the town. Early in the attack upon this problem the group would have to define the qualities needed in a good water supply and to appraise the importance of each. Factors of freedom from pollution, abundance, immunity to the effects of droughts, "softness," economy, and the like would need to be considered. On each variable the allowable limits would have to be determined, and a weight would have to be given to variation within these limits. When these requirements had been specified, it would then be possible to give intelligent consideration to the various possible resources—brooks, creeks, wells, reservoirs—and to assemble the facts with regard to each in order to relate facts to objectives.

It is important not only that the problem-solver have a clear picture of all the conditions which are set by the problem and which must be met in a solution but that at the same time he free himself of any restrictions which are *not* required by the problem. The individual's efforts at problem solution are often blocked by the introduction by him of certain additional restrictions which are not inherent in the problem. In the illustration of the previous paragraph, for example, the group might have limited themselves to considerations of surface sources of water and so have left out of consideration the possibility of solving their problem by the use of wells. In the familiar six-matches puzzle,[2] the focus of difficulty is that the person working on the puzzle almost always introduces the extra assumption that the arrangement of matches is two-dimensional. As long as this restriction, often implied and unverbalized, sets the limits of his attempts, he is necessarily unsuccessful; but often, as soon as he entertains the possibility of a three-dimensional solution, the correct arrangement emerges and the problem is solved. At another level, consider the child who meets for the first time the task of multiplying by a fraction. All of his previous experience of multiplication has carried with it the outcome of "make bigger." The child is unlikely to accept spontaneously a solution of this novel task which gives a result smaller than that with which he started. "Multiplication" is likely to carry with it the self-instruction "make larger," and this interferes with generalization of the process to the new situation. As the positive requirements of the problem are analysed and made clear, therefore, the problem-solver should also attempt to identify and free himself from the further restricting assumptions which *he* has introduced and which are narrowing the scope of his attack upon the problem. Studies of problem-solving have repeatedly shown that the persistence of some single "set" or "direction" in the individual's attack is one of the most common causes of failure.

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[2] The task set by this puzzle is as follows: Required to arrange six matches so as to produce four equilateral triangles, each side of each triangle being one match long.

In addition to determining what is required, the problem-solver needs to put together in an organized way all the items that are specified by or known about the problem. This involves both an analysis of the problem situation itself and a search for relevant facts in the background of the individual and in other sources. Thus, the pupil's problem of what to do after completing high school would be defined in part by such facts as his parents' ability to finance further education or by his high-school grades. Relevant data would be the boy's memories of different types of work he had done during summer vacations. Further information which would provide the basis for a sound solution would be found in pamphlets describing the duties and conditions of work in different jobs. The extent to which outside sources of information will need to be referred to will depend upon the scope of the problem, but some use of source materials will be quite general. The skills of finding, digesting, and organizing information constitute important contributory techniques to the process of problem-solving.

The analysis of what is required and of what is given provides the individual with what we may call a "search model." The search model provides both the directing stimulus which maintains and gives orientation to the individual's efforts to deal with the problem and the standard against which proposed solutions of the problem are judged.

Proposal of Hypotheses for Solution of the Problem

At any point in his attack upon a problem, the individual is likely to produce some proposal for solving it. Often the problem is hardly apprehended as such before some suggestion for dealing with it occurs to him. Thus, the boy who finds a tarry street blocking his way to the movie may immediately think of going a block to the right. The child who is shopping for a Christmas present may immediately think "candy." Further proposals for hypotheses for solution emerge from time to time at various points in the clarification of the problem or the testing of earlier solutions. Where do these hypotheses come from? What principles govern their emergence? We must admit that we can give only a partial answer to this question, but we must do our best. We shall probably need to recognize three types of factors as governing the emergence of hypotheses: (*a*) factors of specific individual experience, (*b*) factors of individual maturity and intellectual level, and (*c*) factors in the dynamics of the problem situation itself. Let us consider each of these in turn.

(*a*) *Individual experience in relation to hypotheses.* It seems axiomatic that an individual's suggestions for solution of a present problem depend on his background of past experience. This is certainly true in the negative sense. The child who had never learned to multiply will have little to offer in determining the cost of a class picnic, where a certain amount must be spent for bus fare for each child. A child who has heard, seen, or read nothing about life in colonial times is unlikely to have a relevant suggestion about the class dramatization of the first Thanksgiving. Experience is also important in the positive sense that fruitful hypotheses typically stem from a great richness of knowledge of a field. The biographies of distinguished scientists and inventors, for example, give repeated testimony of their omnivorous absorption of a wide range of knowledge relating to their field of interest. In general, the more knowledge and experience an individual has in any area, the more fluent and fruitful we may expect him to be in solving problems in that area.

However, there is not a one-to-one relationship between knowledge of an area and ability to solve problems in that area. Studies of the relationship between performance on tests of information and on tests of problem-solving have shown this relationship to be quite moderate. There is a tendency for those who know more to be better problem-solvers in that field of knowledge, but there are many exceptions. There appears to be a real gap between factual knowledge and ability to solve problems. There are probably two reasons for this disparity. In the first place, to acquire facts and to use them probably call for somewhat different qualities in the individual. The pupil who has the skills of learning and the industry and application to acquire many items of information in a field is not necessarily the pupil who has in highest degree the abilities to select, relate, and organize those items. In the second place, the manner in which knowledge was acquired almost certainly influences the readiness with which it may be used in problem solution. Proposing a hypothesis for problem solution involves essentially the transfer of techniques, in whole or in part, to a situation which is novel in some respects. It involves, frequently, the recombination of parts from various previous situations into the new solution pattern. All that we know concerning the conditions of transfer is, therefore, relevant here. Greater persistence and transferability from learning that involves understanding rather than memorization, improved transfer when attention is given to underlying techniques and skills, more available knowledge when generalizations are arrived at by the learner, broader generalizations when application is made in a variety of contexts point to the conditions which should be fruitful in yielding hypotheses. It is not merely how much is learned, but how it is learned.

Practice may even interfere with problem-solving if it is routine and stereotyped practice. Consider problems of this type: You have three containers. The first holds exactly 45 quarts, the second holds 10 quarts, and the third 3 quarts. Using these, how could you measure out exactly 29 quarts? Children taught the procedure for solving this problem (the procedure may be expressed as $A - B - 2C$) and given practice on other problems, for which the same procedure worked, were found to carry this procedure over to still other problems, even where a very much simpler procedure was possible.[3] When given problems which could not be solved by this particular procedure, many of the children failed completely. They had much less success than did other groups of children who had not had the special practice. Adults also showed the same restricting and blinding effect of practice with the specific technique. Again, high-school geometry students were given several originals to solve, all of which called for a proof that a certain pair of angles were equal and all of which involved the demonstration of congruence of two triangles as a part of the proof. When these students were then given a very simple problem, in which the proof only involved the statement that vertical angles are equal, they continued laboriously to construct triangles and to demonstrate the congruence of the triangles. In these cases, repetition of a uniform routine problem solution served to restrict the range by hypotheses and to blind the pupil to quite obvious lines of attack. The investigator in these studies suggests a number of explanations for the result but is inclined to believe that it is, in part, a reflection of the pressures in our schools for rapid and faithful reproduction of the pattern which has been provided by the teacher. The results suggest strongly that following any formal pattern of "steps" for problem solution may hamper the solution of genuine problems more than it helps. The earlier point about the illogicality and diversity of mental operations in the solution of genuine problems fits into this same picture. In any event, it seems clear that training and practice have a qualitative dimension which may be as important as the quantitative one.

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[3] Abraham S. Luchins, *Mechanization in Problem-solving*. Psychological Monographs, No. 248, 1942.

(*b*) *Intellectual maturity in relation to hypotheses.* A second major factor influencing the emergence of hypotheses for problem solution is the intellectual maturity level of the problem-solver. Of course, intellectual maturity and richness of informational background go together, so that usually the more mature individual also has the greater store of information and experience to draw upon. But apart from the accompanying experience, one of the marks of intellectual development is the readiness with which the individual apprehends relationships among objects or concepts and the fluency with which he produces concepts or ideas standing in any desired relationship to one another. General intelligence has even been defined as the ability to educe relationships and correlates. There is no evidence that this ability appears suddenly or that there is any age or stage at which it appears. There is no point at which school children begin to be able to solve problems. Even the preschool child, at his own level and within the scope of his own experience, is a problem-solver. The change as the child grows older is in scope of interests and experiences, in fluency, in richness and relevance of hypotheses, and in the sagacity with which a hypothesis is followed through to its implications.

(*c*) *Situational dynamics in relation to hypotheses.* A third factor governing the emergence of hypotheses from a problem situation is the dynamic structure of the situation itself. As indicated in the previous section, the process of clarifying a problem is a process of defining a gap, a gap between what is known or given and what is required. This gap constitutes what we have spoken of as the *search model.* The search model is a sort of ideal of what is required as the essential nature of the solution. It may take some such form as:

An excuse which will get by the teacher for my being late.
A way to get across the creek without getting wet.
A way to manipulate given Formula A so as to get required Formula B.

The search model exercises both a dynamic and a directive effect upon hypotheses. It represents a verbalization or visualization of the individual's *need* and serves as a rallying point for mobilizing the individual's efforts toward solution of the problem. At the same time, the search model epitomizes the essential form of the *solution* of the problem and sets the individual to notice and accept any idea patterns which appear to correspond to that form.

The dynamics of the problem situation and the role of the search model can be illustrated by an example which Wertheimer[4] has analyzed so fully—the task of determining the area of a parallelogram. Specifically the task with which the individual is confronted is that of finding a procedure for determining the area of a parallelogram, when the lengths of a pair of parallel sides and the distance between the sides of the pair are given. That is, in Figure 1 the distances *A* and *B* are given, and the area of the figure is required.

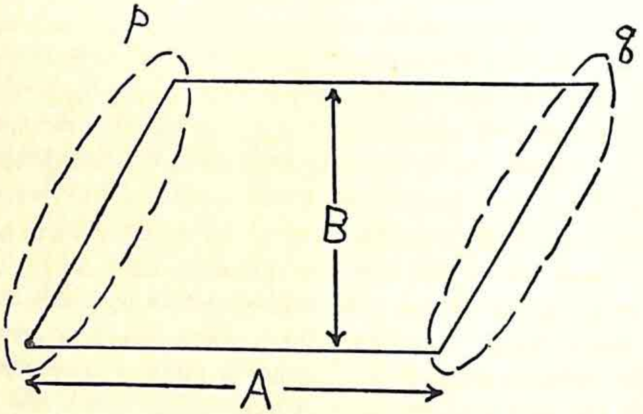

Fig. 1

The process of clarifying this problem is one of making clear and explicit what is required as a solution and what is known as a starting point. The required outcome is quite explicitly stated in the problem, i.e., it is an exact and proveable procedure for determining the area of the parallelogram. What is known or given must, however, still be assembled from what is stated in the problem, from what is already known about parallelograms, what is known about the areas of plane figures, and any other relevant information possessed by the individual.

In the course of assembling this store of available information, the individual may very likely call to mind the procedure which he had previously discovered or been taught for finding the area of a rectangle, i.e., that the area of a rectangle is equal to the length of one side times the length of the perpendicular side. The subject may then say to himself, "How can I make this into a rectangle?" That is, his search model is for a procedure to translate the parallelogram into the known rectangle. With this guiding model, attention is directed naturally to parts of p and q of the figure, which are now "bad" as far as the search model is concerned. The forces are directed toward making these "good" in terms of the required model. Under this stress, the figure may be restructured, as in Figure 2, and now seen as a rectangle with sides of lengths A and B. The structural reorganization has taken place in line with the demands of the search model.

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[4] Max Wertheimer, *Productive Thinking*, pp. 14-78. New York: Harper & Bros., 1945.

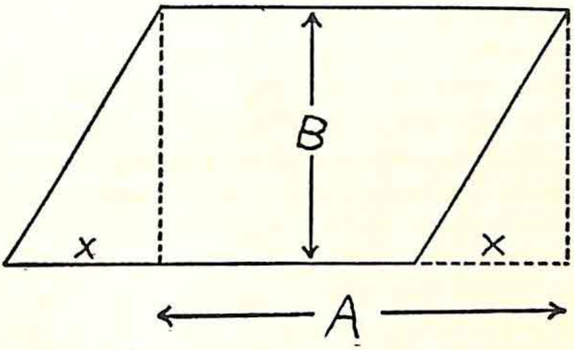

Fig. 2

In this very same problem, however, an individual might start out with a different orientation and set up a quite different search model. He might recall that the area of a triangle is equal to one half the base times the altitude, and his search model might then become "How can I divide this figure into triangles of known area?"

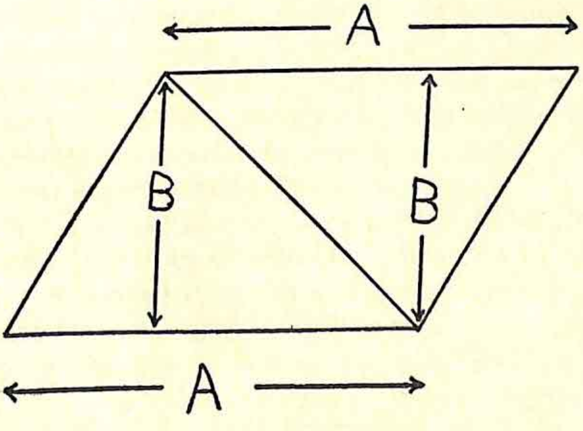

Fig. 3

Under the dynamics of this different search model, the figure would then be reconstructed as in Figure 3. An equally satisfactory demonstration would result, showing that the area was $2(\frac{1}{2}AB)$, the sum of the areas of the two congruent triangles.

In each of these solutions, the task required restructuring of the figure that was originally presented to the subject. The difficulty of the task lies in part in the fact that the original figure is a relatively "good" one, with a simple balanced and symmetrical structure. The dynamics of the figure are such that it is relatively difficult to break it apart and reconstitute it in the ways that are required for the solution. These dynamic factors are most readily pictured in geometric and other spatial problems. The same concepts apply, however, to problems of other types. When a boy's belt breaks, his search model may take the form "something to hold up my pants." He may then think of rope, string, pins, and so forth, rejecting each because it is not available where he is. It may be only tardily, if at all, that he thinks of using his necktie because the tie is already incorporated into the structure which is himself.

Evaluation of and Selection from among Hypotheses

The very fact of having a hypothesis, of entertaining a suggestion for dealing with a problem, implies a further act of appraising that hypothesis. The evaluation may be subjective, vague, and not at all clearly formulated. It may be no more than a barely verbalized feeling of "No, that won't work." But to some extent evaluation, with subsequent acceptance or rejection of the hypothesis, is always present. However, it is not enough for evaluation to take place. For effective problem-solving it is imperative that the evaluation be thorough and that it be rigorous. It is at this point that the weakness of much every-day thinking is found. When a hypothetical solution to his problem comes to mind, the individual accepts it too glibly, without searching out all the implications of the solution and seeking evidence to affirm or deny the correctness of these implications. Records of the work of outstanding scholars, by contrast, show the infinite pains and labor with which every hypothesis was put to the proof.

Evaluation of a hypothesis means taking the facts and conditions which were given in the problem or which have been established by the individual, operating upon them in accordance with the hypothesis, determining the results of this operation, and comparing the results with the requirements of the task. One morning I find, for example, that the starter of my car will not work. I think that perhaps the starter switch is broken, because it has been giving a good deal of trouble for several months. Then I remember that the service station replaced the switch only a week or two ago. I reject the hypothesis, tentatively at least, following some such thought pattern as:

> This a new switch.
> In my experience, new parts do not usually break.
> Therefore, it is not likely that the switch has broken.

As a second hypothesis I think that maybe the battery has gone dead. I remember that my young daughter was playing with the cigar lighter the day before. Without formulating the pattern in systematic order and precise words my thoughts take some such form as:

> The life of a storage battery is often two or three years.
> This battery is three years old.
> Therefore, this battery might well be wearing out.
> N. was playing with the cigar lighter.
> The cigar lighter can get stuck in the *on* position.
> When on, the cigar lighter uses a good deal of current.
> The cigar lighter may have used up all the available current in the battery.
> With a dead battery the motor would not turn over.
> This motor does not turn over.
> Therefore, it is quite possible that the battery is dead.

The verbal statements are, of course, much more complete and orderly than my actual thought processes, which short-circuit the grammatical niceties of approved English expression. At this point, I carry the process through one further stage in the process of evaluation. This we may call "if—then" thinking. If the battery is dead, then what other phenomena follow? If it is quite dead the car lights should not light, the horn should not blow, the car heater should not operate. I press the horn button and get no response, turn on the lights and get only a dim glow. The predictions from my hypothesis are verified by the test of experience, and my hypothesis is further supported. At this point I summon the garage man, and his testing instruments add the final demonstration of the correctness of my hypothesis.

Sound evaluation involves three major aspects: (*a*) the bringing to bear of all the relevant information to provide correct premises for reasoning, (*b*) a rigorous process of "if—then" thinking to indicate the conclusions which follow logically from those premises, and (*c*) test of the conclusions to see whether the events which they predict do in fact occur. The first aspect re-emphasizes the importance of a full definition and exploration of a problem. It is only in terms of a full statement of the underlying facts and conditions that an adequate evaluation can be made. With regard to the second point, the carrying through of rigorous deduction of consequences from the known facts, we meet both a question of habit and of skill. It is necessary on the one hand to develop in the individual habits of suspending judgment and of carrying through the evaluation process. It is necessary on the other hand to build up his skill in doing so. To a very considerable extent the progress which can be made along these lines is limited by the intellectual level of the individual. However, skills of thinking can be improved as a result of teaching.

> There is no evidence that students acquire skill in critical thinking as a necessary by-product of the study of any given subject. On the other hand, almost any subject can be so taught as to put pupils on guard against hasty generalization, contradictory assertions, and the uncritical acceptance of authority. . . . .
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> In general the research indicates that if the objective is to develop in pupils an attitude of "reasonableness" and regard for the weight of evidence and to develop the ability to think critically about controversial problems, then the component attitudes and abilities involved in thinking critically about such problems must be set as definite goals of instruction. . . . .
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> The efficacy of given training to think critically and the amount and quality of transfer which occurs will be greatly influenced by: (1) the method of presentation, (2) the degree to which self-activity and personal experience are induced, (3) the means of furnishing precision, definiteness, and stability to the course of this activity, (4) the extent to which the desired outcomes are set up as definite goals of instruction, (5) the extent to which the processes of reasoning and guiding principles are made clear to the students, and (6) the degree of relationship or similarity between specific elements in the training and their existence in the new situation to which transfer is desired.[5]

Procedures for testing the conclusions which are reasoned to follow from a hypothesis range all the way from the simplest and most casual observation to the most elaborate techniques of experimental design and refined precision instrumentation. As thinking moves out of the realm of everyday affairs into the domains of experimental science, special skills both in designing and carrying out observations become basic tools for the testing of hypotheses.

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[5] Edward M. Glaser, *An Experiment in the Development of Critical Thinking*, pp. 69-71. Teachers College Contributions to Education, No. 843. New York: Teachers College, Columbia University, 1941.

Social Factors in Problem-solving

The examples cited so far in this chapter to illustrate the nature of problem-solving have all dealt with the efforts of a single individual to solve a problem. Much of real life problem-solving is thus individual. But it is also true that many of the most important problem-solving activities in our contemporary world are carried out by groups. At the national level, it may be a committee in Congress trying to develop a workable tax law. At the local level, it may be a group of teachers revising the social-studies curriculum. At the child level, it may be a neighborhood group of children planning a picnic. In each case, there is a joint objective, and joint efforts toward it.

When a group works together on a problem, a number of additional considerations enter, some of which represent advantages and some of which represent difficulties or complications. Some of the chief considerations may be summarized as follows:

1. The group typically brings a broader background of experience to a problem situation than does any single individual.
2. As a reflection of 1, the group is likely to produce more and more varied suggestions for dealing with a problem than will arise from a single individual.
3. The diversity of viewpoints is *likely* to be more representative of the larger population from which they were drawn than is the viewpoint of the single individual.
4. As diversity of background and interest within the group becomes greater, it becomes increasingly difficult to reach a real agreement among the members of the group as to the definition of the problem and the values to be served. Reconciliation of conflicting goals becomes a real problem.
5. Just as a group is likely to produce a greater range of suggestions, so also a group is likely to be more productive in criticisms of proposals and bases for rejecting them.
6. Interstimulation is a distinctive feature of group effort. The suggestion by X, which is criticized by Y, serves as the stimulus to Z for a new and perhaps quite different suggestion.
7. Interpersonal dynamics becomes a significant element. The assertive, the dogmatic, and the persuasive individual—each plays a distinctive role.
8. With increasing size and diversity of group membership, unity and integration of effort are often difficult to achieve. Group members may show a tendency to "ride off in all directions."

The summing of the various factors which we have mentioned leads to a group performance which is often superior to that which would be produced by a single individual. But whether the group will develop superior solutions to problems depends upon the nature of the task. Those aspects of a task which call for breadth of suggestions, prompt identification of unfruitful directions, interstimulation, and variety of background and point of view can well be attacked by a group. Those which require sustained and closely integrated creative effort may perhaps best be dealt with by the individual.

The universality and importance of group problem-solving is recognized by the modern school, and projects are undertaken by groups and developed by them co-operatively. This is as it should be. Working together as a group involves a number of social and intellectual skills of subordinating immediate individual interests, of maintaining the direction of group effort, of summarizing and integrating, all of which need to be developed by experiences in school.

WHAT CAN EDUCATION DO TO FOSTER LEARNING THE TECHNIQUES OF PROBLEM-SOLVING?

In the previous section different aspects of problem-solving were discussed and some of its outstanding characteristics were considered. Although some implications for school practice emerged, emphasis was upon the basic factors in problem solution. In the present section, attention will be focused upon implications for school practice, and suggestions will be made as to ways in which the school can contribute to the effectiveness of the problem-solving techniques of its graduates. In this section the phases of problem-solving will be discussed in the same sequence as in the previous section.

How Can Awareness of Problems Be Increased?

When we recognize the relationship between awareness of problems in an area and experience in that area, we see that one contribution which the school can make is to provide a rich and varied experience background. The more widely the school can reach out beyond the scope of books and classroom, beyond skills and drills and into a variety of areas of experience, the more readily will problems open up to the child. Simple science experiences for the elementary-school child, visits to stores and factories, courts and fire houses, zoos and museums, provision of shops and tools, of art materials and media, liberal use of movie and picture, a variety of clubs and special-interest groups—all of these serve to enrich and broaden the experiences of the pupil. They expose him to question-provoking situations; they involve him in effort-provoking enterprises; they raise problems.

A second contributing feature in the school enterprise can be the attitude of the teachers toward questioning. The young child is naturally a questioner. The school must strive to retain and foster this questioning attitude. When it provides an atmosphere which is friendly to questions, one which accepts the questions in a positive way even when they may be embarassing or momentarily inconvenient, and one which gives encouragement to the asking of questions and the seeking of answers, it encourages the attitude which approaches the world as a place to be explored, investigated, and understood. By contrast, the rigid approach which limits "problems" to those which are in the book or in the course of study, which hews to the line of prescribed fact, can stifle any opportunity to experience or express problems of genuine personal concern.

How Can Abilities of Problem Clarification Be Improved?

Effective clarification of a problem demands, on the one hand, a background of knowledge which can be related to the present problem, supplemented by efficient skills of obtaining further information and of organizing both the old and the new. On the other hand, it involves attitudes and habits of suspending judgment, of being thorough in exploring a problem area, of being systematic in organizing the results of such an exploration. There are here, then, a group of knowledges, skills, and attitudes which education must try to develop.

In the first place, education must provide the background of information which affords the basis for problem-solving in each area of concern. The student who would deal with problems of chemistry must know the characteristics of the chemical elements and the structure of the periodic table. The solver of quantitative problems must have command of the requisite arithmetical concepts and skills. The usefulness and availability of knowledges and skills for application to a problem situation depend, however, upon the manner in which those knowledges and skills were learned. Routine practice of arithmetic combinations with emphasis on automatic habituation of response results in skills which are less transferable to new combinations than when the structure of the number system is emphasized Practice using a specific "rule" for dealing with quantitative problems at least temporarily blinds the individual so that he fails to adapt his method to a novel problem requiring a different technique. The isolated, piecemeal nature of many learnings leads to rapid forgetting of what has been learned. Knowledge which is useful for problem-solving is organized knowledge, organized on the basis of the structure of the field and in terms of significant generalizations, organized by the learner and applied by him in a variety of contexts.

In addition to having a rich background of knowledge and experience to draw upon, the individual also needs to know how to find the facts which relate to his problem and how to organize these facts after they have been assembled. Here are a number of skills which it is the province of the school to develop. Skills in the use of a library and in locating information within a library, skills in using reference books of all types and of using the aids which a book provides for locating specific items, skills in skimming reading materials, skills in careful and critical reading to note detailed facts and to get specific meanings are all information-getting skills which can profit from being made the direct objectives of school instruction. Again, skills in note-taking, in precis-writing and in outlining represent skills of organizing information which have general applicability in attacking problems of broad scope which go beyond the present experience of the individual. In all these skills, instruction graded to the child's maturity level is needed to provide a foundation for attacking problematic situations.

In addition to skills of gathering and organizing relevant facts, effective defining of problems calls for a team of attitudes on the part of the problem-solver. One attitude is represented by a willingness to suspend action, to withhold judgment upon a problem until the necessary data have been gathered. Another attitude is reflected in thoroughness in exploration and fact-gathering. A third is seen in systematic organization of materials on a problem. These manners of approach to a problem are learned through the experience which the child has with problem situations in and out of school. It is important, therefore, that the classroom approach to problems be such as to foster desirable attitudes. When a problem arises in class which is worthy of the attention of the group, the teacher should stave off pressures for a quick answer, should encourage full exploration of the problem, and should guide the group in the systematic and organized statement of the problem with all of its relevant information. Emphasis should be explicitly directed toward achieving a clear and exact search model.

How Can Discovery of Hypotheses Be Improved?

In the previous discussion, it was suggested that the variety and appropriateness of the hypotheses which the individual discovers are a function of his intelligence level, of his experience background, and of the dynamic structure of the problem situation. To direct our efforts *specifically* at modifying intelligence level is not profitable. To some extent, level of functioning intelligence will reflect the general quality of the total social and educational history of the individual.

The improvement of experience background and of skills for gaining and organizing experiences was discussed in the preceding section. This route is probably the one through which we can hope to have the most effect upon the individual's supply of hypotheses. A richer, better organized experience background together with functional skills for supplementing that background provide the foundation from which hypotheses emerge.

The dynamic structure of the problem situation is to some degree within the teacher's control in so far as he designs the problem or enters into the problem solution. Thus, an artificial "problem" formulated by the teacher may be formulated in its simplest form, so that the answer is suggested by the way the problem is presented or stated, or it may be disguised in varying degrees. The difficulty of discovering the method of attack lies in some measure within the teacher's control and can gradually be increased in successive problem exercises. When the problem has arisen more spontaneously, and is not one presented by the teacher, some control of the structure of the problem situation can still be exercised by hints and suggestions which serve to direct attention to particular features of the situation or to suggest new ways in which it may be seen.

One suggestion which may possibly be offered for increasing the range of hypotheses is that of dropping a problem for a time, if the individual is blocked upon it, and returning to it later. Reports of scientists and inventors from their individual experience, together with some experimental studies of the processes of inventive and creative work, support the value of an "incubation" period. When a problem has been analyzed in detail and relevant information assembled, it sometimes helps to put the problem away for a while. Rigid methods of attack and limiting assumptions may lose their control over the individual, and new variations of method may be suggested. The role of time for the maturing of hypotheses needs recognition by teachers, and the genuine problems of the pupil should not be forced to a premature solution.

How Can the Evaluation of Hypotheses and Selection from among Them Be Improved?

The testing of hypotheses involves, again, a combination of skills, knowledge, and attitudes. These overlap to a considerable extent those which were discussed in connection with defining the problem. The skills required are those of "if—then" thinking, of logical reasoning. Studies at the high-school level indicate that these skills are subject to improvement if they are made the subject of conscious teaching and direct school effort. Almost any course, English, geometry, science, or social studies, can be taught so as to yield improvement in the skills of reasoning, but no course automatically yields such improvement. The improvement only results when the skills are singled out for direct attention and when the subject matter is thought of as a medium for carrying the development of techniques. Thus, the usual course in geometry is found to yield little gain in reasoning skill, but a course which subordinates geometry, as such, to the teaching of thinking skills has been found to result in substantial gains.

A first aspect of testing hypotheses is ability to deduce by logical reasoning the consequences of the hypothesis. But reasoning must be supported by knowledge. Knowledge of the facts in the situation supplies the premises from which to reason. A boy has a piece of metal and wants to know what kind of metal it is. He postulates, "If it is iron, then it will attract a magnet," and proceeds to test his conclusion with a magnet. The "if—then" thinking which is carried out in this case is only possible because the boy had prior knowledge of the relationship of iron and magnet. In any testing of hypotheses which we can think of, there will be the same dependence upon knowledge of facts, of things, and of the way the world is constituted. All that we have previously said about the importance of functional and organized knowledge can be repeated at this point.

Underlying all knowledge and the skills of reasoning are habits or attitudes of willingness to reason, of following through in the testing of hypotheses, of withholding actions or judgment until a conclusion is adequately supported. These dispositions gain or lose strength as they are or are not supported in the problem-solving patterns of the class group. In the activities of the classroom, the teacher should see that hypotheses are followed through thoughtfully and not glibly accepted or rejected. When problems arise in the classroom for which insufficient evidence is at hand, and there are many problems today for which the combined wisdom of mankind has found no conclusive answer, it should be clearly recognized that the available evidence does not permit a definite solution. At the same time, appropriate attitudes need to be developed toward authorities and source materials. The most pressing need is to break loose from the blind faith which so often ties the pupil to words of teacher and of text, and yet care must be taken to avoid a hypercritical attitude which prevents the pupil from making effective use of other people or other sources. In all these respects, the attitudes and approaches toward problems which the teacher sanctions provide the pupil with his model and guide.

Concluding Statement

By its very nature, problem-solving—the attack upon problematic situations for which the individual has no ready-made response patterns—is complex and variable behavior. The individual brings to bear upon the problematic situation, in varying combinations, the knowledge, skills, and methods of attack which are at his command. Some aspects of the problem-solving enterprise have been discussed in this chapter. There is no simple pattern or routine of problem-solving which can be isolated and taught in the schools as a simple unitary skill. Rather, problem-solving is an integration of a host of more particular knowledges, skills, and attitudes with which the schools can appropriately be concerned. A wide range of interests and experiences, an organized and functional stock of background information, efficient skills for locating and organizing needed information, perseverance yet flexibility in attacking problem situations, a willingness to suspend judgment until the evidence is in, habits of testing critically any proposed solutions, attitudes of critical appraisal of the reliability and bias of sources, skill in "if—then" thinking—these and many more are the qualities which the school must try to develop if it is to improve problem-solving ability in its pupils.

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SECTION III

APPLYING PRINCIPLES OF LEARNING TO THE IMPROVEMENT OF INSTRUCTION AT DIFFERENT LEVELS OF SCHOOL WORK

CHAPTER IX

IMPLICATIONS FOR ORGANIZATION OF INSTRUCTION AND INSTRUCTIONAL ADJUNCTS

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The course of events in a classroom situation cannot be left to chance. A teacher, when he steps before a class to participate in and to guide learning experiences, must have some idea as to what should and is likely to occur. This is true in situations which are planned co-operatively with the children as well as those in which the teacher plans by himself. What principles and facts are available for the guidance of teachers who are about to organize teaching-learning situations? What generalized organizations are typically suggested and found in practice? A number of differing organizations are found, due to a number of historical influences and to factors within given current school situations.

The improvement of current instructional organizations and the invention of new ones is going on constantly. The aims, curriculums, administrative policies, and particularly the instructional practices within our schools have been under constant criticism, both friendly and antagonistic. This is desirable in a dynamic democracy. The details of our historical development are available in standard references and have been touched upon in other chapters of this yearbook. We may note for the purposes of this chapter the contribution of the early Herbartians, Frank and Charles McMurry, and the later influence of Harris, Colonel Parker, Eliot, Harper, James, Dewey, Morrison, Hopkins, and many others. The emphasis of these men upon principles which underlie instructional practices has greatly influenced classroom procedure.

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[1] Chapter ix was originally to have been written jointly by the present author and Dr. Ernest Horn, State University of Iowa. Due to pressure of several other commitments, Dr. Horn had to withdraw, but only after making several efforts to find time to continue. The author acknowledges with sincere appreciation his great indebtedness to the two critical readings given the manuscript by Dr. Horn. A large number of detailed statements were improved, and several complete passages supplied. The author, however, assumes responsibility for all statements, and it is not to be assumed that Dr. Horn endorses every statement made.

An increasing understanding of democratic life and of the induction of youth into that life; increasing knowledge of the nature of the learner, particularly of his learning processes; clearer views of the nature and use of subject matter; and better insight into the role of the teacher have been combined in the development of major improvements in teaching. Four major general results may be mentioned, with details to be developed as the chapter proceeds. *First*, we see more clearly the differences and the relationships between what may be called the "subject-matter approach" and the "experience approach." *Second*, a large number of vital improvements have been made in those methods which are organized around a subject-matter core. *Third*, new organizations have been developed which emphasize the total experience of the learner. *Fourth*, the importance of pupil purpose has become central, regardless of the formal details or type of organization.

The contrast between subject matter and experience, indicated above, is not an antagonistic one, but one of emphasis, as later paragraphs will show.

General Definitions

The materials generally offered for the guidance of teachers are summarized under either of two broad general schemes; the familiar assign-study-recite-test procedure, or the more recently developed unitary organization. The verb "assign" and the noun "assignment," as used today, cover practically everything from arbitrary page assignments wholly organized by the teacher to a series of experiences with subject matter co-operatively planned by teachers and pupils together. Instructional organizations under assignment may, therefore, range from the exceedingly formal to those which represent reasonably well the initiation of a desirable learning experience.

The unit organization is found in two forms; the subject-matter unit, and the experience unit. The terms *project* and *center of interest* are often used also and may refer to either type. The terms *activity unit* and *behavior unit* usually refer to an experience unit. The subject-matter unit, like the assignment, places chief emphasis upon the subject matter, while the experience unit places chief emphasis upon the total experience of the child. The term "experience unit," like the term "assign," covers a wide range. An experience unit may be based on shallow or fleeting interests in the mistaken attempt to utilize pupil purpose. The materials and experiences may be superficial, spotty, and unorganized. At the other extreme will be found units under most careful development as they proceed, despite the fact that teachers and pupils are facing a new situation for the first time. The experience unit is far more difficult to manage than any of the others.

One of these approaches is not wholly wrong, the other correct; each has a place and function. We hope to avoid the error of "either-or" thinking. Choice of approach and organization and method of planning is affected by a number of factors. The important factor is the degree to which the organization used can be based on socially desirable pupil purposes and can combine subject matter and experience in a way valuable to the learner. Continuously integrating behavior on the part of the learner is a major aim. Before turning to certain other factors affecting choice of instructional organization, let us consider a few introductory definitions.

The *assign-study-recite-test* organization carries its own definition within its descriptive title. The learning situation is organized around materials and experiences which are assigned. The pupils then study in various ways. The results of their studying is presented and shared during a recitation period. Testing of results occurs at the conclusion of a series of assignments and may occur at stated periods within the sequence. The procedure may range from the deadly dull, rigid, and imposed to the vivid and provocative, depending upon the ability of the teacher. Pupil participation may be neglected; there may be even harsh rejection of pupil interests and motives, not to mention suggestions. Provision is made by other teachers for pupil participation in setting up assignments, to the very limits set by pupil maturity and experience. The steady improvement of this general scheme of organization will be outlined below.

A *subject-matter unit* is a series of educative experiences centering upon subject-matter materials which are arranged around a central core found within the subject matter itself and which are to be studied by pupils for the purpose of acquiring learning outcomes derivable from experiences with the subject matter. The core may be a generalization, a topic, or a theme.

An *experience unit* is a series of educative experiences organized around a pupil problem, utilizing socially useful subject matter and materials and resulting in the solution of the problem and in the acquisition of learning outcomes inherent in the experiences.

The distinction between subject-matter units and experience units is in part arbitrary. The terms are useful to the extent that, in given situations, they indicate the instructional emphasis to be upon organized subject matter or to be upon the total experience of the learner. Again we must beware of the either-or interpretation. The actual instructional organization developed by a teacher must of necessity use subject matter and also experiences.

The subject-matter unit utilizes many, in fact could not proceed at all without, pupil experiences. Reading or studying books, reciting, working examples, and listening are all experiences, even though somewhat narrow and limited. A wider range of activities will appear in subject-matter situations where policy and supplies permit and good teachers are at work. The experience unit draws heavily upon many diverse sources of subject matter. The evidence seems to show that a good experience unit is likely to use as much subject matter as a subject-matter unit, with a somewhat wider range of activities. The latter fact is, however, subject to modification both ways in terms of teacher competence.

The emphasis here is not upon contrasting or setting up an opposition between subject matter and experience. Each is of prime importance, each affects the other. The meaning of any subject matter will be significantly affected by the learning experiences through which the pupil meets it; the value of any learning experience will be affected by the subject matter available and used. The important thing is a combination of subject matter and experience which will have real value for the learner, i.e., aid him in continuously integrating his learning. Integration within the learner, which is the continuing goal, is aided when the learner sees sense in the selection of subject matter and of experiences. The kinds of purposes around which particular learning experiences are organized will differ considerably depending upon a number of factors. The following outline contrasting purposes and methods of organizing must be read with full realization of the difficulties of such summaries. The repeated caution that antagonistic contrasts are not being set up must be kept in mind. Actual practice is in many instances better than and worse than that indicated by the general outline.

Subject-Matter Units:	Experience Units:
... begin, in the intention of adults, to teach approved subject matter to pupils;	... begin, in the intention of the learner, to achieve some purpose; to satisfy some need;
... are organized logically around a core within the subject matter;	... are organized psychologically around a purpose of the learner;
... are prepared in advance, by a person or group already familiar with materials and their logic;	... are organized as they develop by a group facing a new situation for the first time;
... are for the purpose of having the pupil acquire the logically arranged subject matter;	... are for the immediate purpose of satisfying needs of the learner and with the ultimate purpose of developing desirable understandings, attitudes, skills, etc., in the learner;
... are usually organized from simple to complex and within subject fields;	... are usually organized functionally and in disregard of subject lines, especially in elementary grades; often from complex to simple; (the complex urbanized, industrialized civilization within which a child lives is often more comprehensible than the simple life of primitive peoples. Child has no experience with the latter, much, with the former);
... are controlled by the teacher, by adult committee, by course of study;	... are controlled by a co-operating group of learners which includes the teacher; the course of study is utilized as needed;
... are usually centered in the past, in the "accumulated, not the accumulating" culture; little reference to present or future; reference to future usually theoretical;	... are usually centered in present and future; use accumulated materials from past freely in solving present problems;
... rely on formal methods, assignments, distinct lesson types, printed materials as chief sources, learning experiences few and formal;	... utilize co-operatively planned procedures suited to situation, sources in great variety, learning experiences numerous and varied;

...give all pupils the same contact with the same materials; some provision for individual differences;	...give contacts with many materials; individual differences cared for variously and automatically;
...have fixed outcomes which are known in advance and required uniformly for all learners;	...do not have fixed outcomes which are known in advance, and required uniformly from all learners;
...at conclusion, evaluate through the use of formal tests of subject-matter acquisition, usually of fact or skill;	...evaluate many complex outcomes, continuously, with constant pupil participation and through use of many instruments, formal and informal;
...close with a backward look, so-called "review," and are done with when finished.	...lead to new interests, problems, and purposes.

Subject-matter units which bring in materials logically related to the structure of the subject but unrelated to the purpose around which the materials are being organized will interfere with integration. Experience units which introduce a wide variety of activities with but a superficial relationship to the central purpose are also detrimental to integration. The point here is that, regardless of whether the local emphasis is upon subject matter or upon the experience of the learner, only subject matter and experiences should be included within an instructional organization which relate to and support the central purpose, thus enhancing integration within the learner.

The outcome of the assign-study-recite-test organization and of the subject-matter unit are primarily knowledge which can be derived from experience with the subject matter. Abilities, attitudes, and other outcomes in terms of the personal development of the learner can be achieved by competent teachers within the limits imposed by the predetermined subject matter. In less efficient schools the outcomes may degenerate into memorization of isolated facts or of segments of subject matter, without accompanying understanding.

The outcomes of the experience unit are primarily understandings, attitudes, appreciations, abilities, and functional skills. The outcomes in terms of principles and generalizations (understandings) derived from the subject matter are also achieved in good school situations. In less efficient situations, knowledge of materials may be neglected.

The foregoing bald statements need amplification. Extreme proponents of subject-matter curriculums and teaching tend to assume that, if essential knowledge is developed, personality traits will follow also. Extreme proponents of experience curriculums tend to assume that if emphasis is upon development of personal-social-moral traits, the necessary knowledges will be achieved in the process. Each view has elements of truth and of error. Specific provision for each type of outcome must be made in the planning for instruction. Subject-matter teachers must take pains to see that attitudes and personality traits are not neglected; teachers stressing personality development must see to it that essential knowledges, generalizations, and meanings are achieved.

All types of instructional organizations, regardless of emphasis will be effective to the extent that they are planned to reflect life needs. Needs will be immediate and felt, but they will also be remote and have to be called to the pupil's attention.

Factors Which Affect the Choice of Procedures

The teacher's procedure in stimulating and guiding learning is affected by a number of factors, some of which are beyond the control of the teacher.

a) The philosophy and aim of the school system
b) The administrative policy of the leadership
c) The nature of the curriculum
d) The pupils: maturity and background of experience, socio-economic status, and range and type of individual differences within the group
e) The adequacy of instructional materials, the teacher's load, length of school day, the teacher's administrative and extra-curriculum assignments
f) The personality, ability, and training of the teacher

The factors listed have been analyzed at various points in several chapters in this yearbook, hence a brief summary will suffice here.

The philosophy of the school system may be authoritarian or democratic. The authoritarian view will emphasize control and direction from above, thus limiting and confining the teacher's choice of materials and methods. The democratic view will utilize co-operation and participation by all staff members in creating and utilizing methods and materials. The aim of education may be mere mastery of subject matter, preparation for passing college entrance or other fixed-type examinations, or the covering of prescribed texts. The aim may be the development of self-reliant, resourceful individuals. The aim in many instances, of course, uses a desirable balance between knowledge of cultural materials and personal development.

The policy of the school, as indicated in the preceding paragraph, may stress rigid, formal, and mechanical operation of the school in all aspects, or it may provide for flexibility and adaptation to needs and circumstances. One school may insist on mastery of a limited, prescribed outline of subject matter, with less attention to the development of the learner. Careful testing for maintenance and development of knowledge and skill may be required. Schools of this type are sometimes likely to minimize the development of personal controls by the pupil and to rely instead on large automatic transfer of training. Another system may supply a great wealth of subject-matter materials within a framework from which to choose. Greater emphasis perhaps on the development of personal-social-moral traits is to be noted. Subject matter is utilized as one of the important means to this end. Pupil behavior is observed to determine the extent to which desired outcomes are being achieved. Schools of this type may, in some instances, minimize the importance of generalizations to be derived from analysis of the cultural heritage. The policies of most school systems range between the two extremes stated.

The type of curriculum organization is, next probably to the ability and personality of the teacher, the most potent factor in determining how teaching and learning proceed.

a) The curriculum in the great majority of schools is a subject curriculum. In many instances it is a textbook curriculum.

b) The typical subject curriculum is tragically overloaded both as a whole and within nearly all subject divisions.

c) The typical subject curriculum is tragically unrelated to life needs. This is true not only for the life needs of the children but also for the life needs of adults, for both immediate and remote needs of anyone, anywhere, at any time.

Part of this is due to lethargy and crystallization; part is due to ignorance of the techniques of social analysis and of personal counseling.

Needs are often immediately present but neither children nor adults are aware of them. Instructional procedures must bring out these needs. This is particularly true in the case of very real and immediate needs which the child does not see for himself.

A general neglect of emphasis upon specific and intelligent purposes is widespread in typical curriculums.

d) The materials in typical curriculums are still badly placed in terms of maturity and ability of the learners, though considerable progress has been made in certain areas.

e) The correlations between subject areas are rarely indicated.

The formal methods of instruction, so widespread, are in part the result of the backwardness of the curriculum. Difficulties faced by teachers are obvious. What can be done to prepare for better instructional processes?

a) The curriculum load should be reduced until it is manageable in terms of our best knowledge of learning.
b) Material should be more carefully allocated so that problems and materials are not forced upon children whose experience, mental age, and previous training are inadequate.
c) Needs and purposes, either immediately felt or which can be so presented as to be immediately acceptable to learners, must become central in organizing curriculum materials.
d) Every effort can then be made to develop more and more desirable organizations for instruction, as indicated in this chapter and in many other references.

The maturity and experience of the learners and other group characteristics are vital factors affecting the development of instructional procedures. The same must be said of the adequacy of instructional materials, the teacher's total load, and the length of school day and of class periods. These several factors are discussed a number of times and in various places in this yearbook. A very large body of literature is available, both in original studies and in the secondary references. The scant mention here is for the sake of brevity and to avoid repetition and does not indicate lack of importance of the items.

The personality and ability of the teacher is a factor which conditions any and all statements which may be made concerning the organization of instruction and classroom procedures. An able teacher of lively personality, possessed of creative insight into the learning process will vitalize the most formal organizational structure for learning. A dull, unenthusiastic personality will cut the life out of methods which would ordinarily make for vivid, dynamic classroom situations. The general factors of personality and ability are susceptible to definite improvement, but that point cannot be elaborated here. The point here is that succeeding statements concerning organization for instruction are all subject to qualification in terms of the competence of the teacher operating the schemes.

An instructional scheme which gives careful attention to the total experience of the learner seems, on the evidence so far developed, to be superior to one which is primarily concerned with the mastery of subject matter. Not all authorities on curriculum agree with the foregoing statement. We may, however, continue the endeavor to develop instructional organizations which are clearly related to life needs and which utilize subject matter and learning experiences as needed.

A number of generalizations may be advanced, tentatively, at this point. Evidence in support will be found in both logic and fact; that is, in the principles of democratic philosophy applied to education and in the evidence from psychological and educational research.

The generalizations, it must be emphasized, should not be interpreted as "either-or" statements. They are stated here simply and somewhat baldly in order to emphasize certain important distinctions. Each generalization is subject to qualification in terms of given situations, as indicated in preceding pages. Interrelation and overlap between definitions will be developed as each is elaborated in the following pages.

The education of *little children,* of *beginners* on almost any level, and of all classes in the *area of general education* is believed to proceed better when experience units are used by competent teachers.

The education of students who have more *adequate reading ability,* and who have *achieved sufficient maturity* to be able to *learn through verbal abstractions* and to be *entering upon areas of specialization,* is believed to proceed better when the assign-study-recite-test procedure as currently improved is used by competent teachers.

The use of experience units in the area of general education does not in any way exclude the use of good assignments and of subject matter as such as they are needed. The use of assign-study-recite-test and the increasing use of verbal methods in the area of specialization do not preclude the use of many concrete experiences and activities.

THE DEVELOPMENT OF THE ASSIGN-STUDY-RECITE-TEST ORGANIZATION

The Improvement of the Assignment

The assignment is the key to teaching and to learning under this organization. The assignment largely determines what pupils do and how they do it, hence determines the results achieved. The very meaning of assignment has been, as we shall see, definitely expanded to cover far more than reference to books. The improvement of this key factor, the assignment, is important and necessary.

Objective Investigations Indicate Low-level Assignments Predominate. A large number of investigations are available covering many aspects of the assignments: number, placement, time used, effectiveness, types, etc. Summaries of such investigations are available in accessible sources.[2] Statistical and other objective type investigation of the assignment dropped off sharply after approximately 1930-32. The extensive current literature is chiefly descriptive of current practices.

The older statistical studies and the more recent surveys and samplings, one or two made or sponsored by the author of this chapter, reveal astonishing situations. The meager, vague, unanalyzed, wholly inadequate type of assignment predominates in the secondary school, practically to the exclusion of all other forms. One investigator reports that more than four-fifths of the procedures—in the social studies, of all places—involved nothing more than page assignments to a single textbook! A typical oral quiz readily answered by memorizing or paraphrasing the text followed. That these formal methods are widespread at all levels can be verified by any competent observer who will visit any high school or elementary school for a few days. Despite fifty years of attack by competent critics armed with unlimited, valid evidence, there persists the wholly unexplained assignment aimed only at "covering the text." *It would be difficult to devise an educational practice so grossly ineffective, so certainly calculated to interfere with learning, as a page assignment to a single text followed by a formal verbal quiz.* Yet, this is the practice used by the great majority of secondary-school teachers.

Evidence also shows that vague, indefinite, unmotivated assignments are common causes of children's failure to learn. Teachers often comment on the record of pupil failures, but they usually say that lack of effective study habits is the cause. Lack of adequate study habits is in truth a cause of failure, but the type of assignment which does not demand reputable study habits and does not give any help in developing these habits is equally to blame.

Pupil participation in developing assignments is negligible, although definite indications are to be found which show increasing attention to and adaptation to students' interests and abilities. There is a slight tendency for assignments to become more detailed, and in some instances to be accompanied by study guides, problems, and more extensive projects.

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[2] William Carr and John Waage, *The Lesson Assignment* (Stanford University, California: Stanford University Press, 1931); *The Encyclopedia of Educational Research;* Gerald A. Yoakam, *The Improvement of the Assignment* (New York: Macmillan Co., 1932); this volume is devoted chiefly to pedagogical considerations but contains references to the objective findings; see also the *Review of Educational Research,* appropriate issues.

The following paragraphs will present in historical sequence the improvements which have been made in the technique of assigning lessons. Many teachers, limited by administrative policy, insufficient supplies, or inadequate training may improve their present techniques through knowledge of what has been done by other teachers under similar limitations. Progress toward the better forms of assignment may be accelerated.

A Primitive Form of Assignment Is the Arbitrary Designation of Pages, Exercises, Topics, or Chapters. The familiar type of assignment, criticized above, is usually made hurriedly as the bell rings: "Take the next ten pages." "Take the next chapter." "Work the next ten problems on page 92." This is an assignment in only one sense—the pupil knows what pages to cover. The statements indicate where a real assignment may be found, though in given instances no real assignment may be there at all. The statements do not tell what the assignment is or how to handle it. A real purpose, objective, or outcome for the pupil is completely missing. Study guides or aids, questions, even the formal type, are not provided. The pupil is quite likely, in the absence of a legitimate objective, to set up a false or vicious objective such as memorizing material, pleasing the teacher, or getting a passing mark.

Some teachers may be using this type of assignment because of an invalid curriculum policy, because of limitations of instructional supplies, or because of inadequate professional training. The existing conditions must be taken into account in judging them. Nevertheless, such teachers should try to improve their techniques to the absolute limit within the conditions, participate in efforts to improve the local situation, or go elsewhere. Teachers habitually using the primitive type of assignment where limiting factors are not present are open to severe condemnation. They either do not know about or they deliberately ignore the known facts about the importance of pupil purpose, the limitations of a single text, and the wide range of difficulty in instructional materials and the range of abilities among pupils.

Assignments of the somewhat limited type are occasionally legitimate when made within an ongoing sequence with mature students. If the objective was properly established in the beginning and if the work proceeded along fruitful lines, the need for supplementary material is easily seen by the pupils and quick reference may be made. The group will have appraised its progress and decided what to do next.

An Early Improvement Embodied Brief Intellectual Preparation *for the Assignment.* The Herbartian methodology, introduced into this country just before the turn of the century, stressed the preparation of the pupil's mind for the assignment to come. Learning was seen as dealing both with books and with other forms of presentation. The pupil was to be given some introduction, however, to the book assignment or other experiences. The teacher might discuss with the class some important current event, might refer to previous experiences in or out of school, might ask a series of leading questions. A background of information related to the assignment, called by the Herbartians the "apperceptive mass," was thus called to the forefront of consciousness. The assignment to books, references, and related experiences could then be connected with ideas and interests now in the child's mind.

The greater knowledge we now have concerning the variety of learning experiences makes this technique relatively superficial today. Adequately conducted, this step in the Herbartian procedure was in its day a marked improvement over earlier methods. It could be used to advantage today by many teachers who still use the primitive form of assigning.

The pretest introduced about 1925 by the neo-Herbartians, chiefly H. C. Morrison and his followers, was a related technique, designed to give more adequate information concerning the pupil's background as a basis for assignments to come.

Differentiated Assignments Arrived: Minimum Essentials for All, Plus Enrichment for Average and Bright Pupils. The great body of fact, revealed by modern research, concerning individual differences in ability, in interests, and in rates of learning profoundly affected teaching and the settings for learning.

The material deemed absolutely necessary was assigned as minimum essentials to be learned by all. Extended reading in other books or related sources was given to the brighter pupils. The supplementary reading often was more of the same kind covered by the minimum essentials. The reading could be extended, however, in terms of depth as well as breadth. Supplementary assignments, for instance, included reading of contradictory accounts or of several incomplete versions. Summary reports had to be made to the whole class, resulting in comparisons of arguments and conclusions. The entrance of other processes than reading and memorizing is important, as will be shown below.

The difficult reports were assigned to the brighter pupils, the easier ones to the slower children. This often avoids the undesirable division in the group, since slower pupils are not likely to recognize that their assignments are less difficult if they are similar in form to those of other class members. The slow pupil profits so far as his rate and ability permit. He gathers data, evaluates various statements, formulates summaries, and participates in class discussion. He gains in self-confidence, his interests are expanded, and he gets the satisfaction which comes from group membership.

The dominant conception still was the mastery of facts and ideas and essential knowledge in the subject matter. The term "minimum essentials" is in bad repute today because of its established connotation of facts to be retained and of things to be learned by all pupils. Questions may be raised as to the nature and extent of minimum essentials. The beginnings of more varied learning experiences are, however, to be seen. The assignments at their best began more and more to reflect modern knowledge of learning as it appeared.

Assignments Were Expanded To Include Study Guides, Questions, and Many Diverse Learning Activities. The differentiated assignments increasingly included study guides, questions, and job sheets. Many of these additions still aimed at memorizing extracted facts, but making comparisons and evaluations, drawing conclusions, and organizing arguments also appeared. In some cases the study guides, questions, etc., called for the performance of routine tasks and chores. In their better form, the questions and guides were a distinct improvement over mere page assignments. The use of study guides may, however, divert teachers and pupils from the possibilities of co-operative planning. The setting up of precise and important questions or problems co-operatively with the class is far superior, but this practice did not appear for some time.

Eventually many diverse activities pertinent to the problem were suggested in assignments: interviewing persons, observing processes, visiting historic or otherwise important places, trying out things in little experiments, serving on committees, making exhibit materials, preparing dramatizations, making various visual aids, charts, diagrams, etc.

Superior teachers include sufficient time in making assignments to develop explicitly the objectives and the methods for achieving the objectives. An assignment may often include one or more periods of free class discussion for clarification of objectives and for preparing for difficulties to come. Not all sources, procedures, and difficulties can be cared for in any one assignment, but over a period of time good assignments will progressively develop power on the part of the pupil, leading eventually to independent study and learning.

Pupil Participation in Organizing the Questions, Problems, and Projects Developed Recently. A good index of teaching skill is the making of inviting connections between the required subject matter and the interests of the students. Setting up provocative questions designed to cause learners to react to text materials instead of merely to accept them is another desirable technique. The presentation of these connections and questions is certain to provoke discussion, argument, or difference of opinion. The skilful teacher may then derive from the class discussion a series of supplementary study questions. A number of individual and group assignments may supplement the original over-all reference.

The next step, already taken in many schools, is to utilize pupil participation in organizing the assignment in all details. The teacher herself is a member of the group and not only may but should suggest problems which the pupils may have overlooked.

The Characteristics of Good Assignments. The broad general characteristics are easily stated.

1. The objective, the thing to be done, should be stated in clear, simple language. The ability to do this is not immediate and automatic. Study and practice are necessary.
2. A provocative and convincing connection should be made between the subject matter of the assignment and the typical activities, interests, and needs of the pupils' current lives.
3. Assignments, while connected with and motivated by pupil need and interest, must also serve desirable social purposes of education, that is, lead to the development of outcomes useful in the organized society of democratic life.

   Pupil interest does not here refer to the fleeting or transient interests which children may bring to school, though these can often be developed into continuing interests. Pupil interest here means the more or less permanent, learned interests. It is recognized that some interests which are not permanent operate over respectable lengths of time and are thus usable.
4. Study guides, questions, and other aids should be included.

   Commercial guides may be of some help to weak teachers providing they focus on questions worthy of pupil attention. Many guides, however, abound in "busy work" and useless chores so that there is real danger of formality and lack of attention to individual differences and to local needs. Co-operatively arranged questions and guides are of value.
5. Assignments must provide for different levels of achievement and for greatly varied study of learning activities, in accord with the range of differences in ability, interest, and needs within the group. Of supreme importance is the supply of all kinds of instructional materials, including

audio-visual aids, and particularly reading materials which vary in difficulty in accord with variations in reading ability within the group. Supplementary materials and aids should be supplied as financial ability permits. Teachers and pupils can manufacture a great many at little cost if this is necessary.

6. Assignments should be directed to matters for which pupils and teachers see a need for study, the needs being made apparent either by preliminary discussion or from information about the class which may be secured by the teacher from the cumulative records or other sources.
7. Assignments should initiate and motivate substantial units of work. Subsidiary planning for each day and week must be clear and explicit both for guidance and for determining progress. Day-by-day assignments of truly fragmentary type should be avoided rigorously, since, if these are used, the benefits of the large unit are lost and study degenerates into fragmentary memorization. Periodic summaries of progress with attendant reorganization of assignments is desirable. Several studies show that good teachers make far fewer assignments than poor teachers but devote much more time to assigning. The small number of assignments using greater time indicate the use of large units. The belief that the teacher must break up learning into thirty- or fifty-minute chunks, one to be assigned each day, is humorously referred to by Frederick, Ragsdale, and Salisbury as the "ridiculous imperative"!
8. Assignments should use all the time necessary for explanations, for answering pupil questions, for developing an adequate plan of action, for arranging subsidiary individual and committee assignments, and for making sure that all know what is to be done. The time necessary may vary from a few minutes to two periods or more.

   Extended planning of this type must be truly realistic and dynamic; it must not degenerate into a formal pattern. Lists of trivial questions are sometimes posed mechanically by the children who realize that this is one of the tricks. The teacher should, over a period of time, guide toward the recognition of major and minor questions and toward forms of organization which are actually adapted to the immediate problem at hand. The teacher may suggest the major problem and some minor projects herself, both as a matter of getting important problems before the class and as a part of the guidance process.
9. Assignments may be made at any stage of the lesson in such way as to take advantage of or to develop need or interest and at the same time preserve continuity.
10. Assignments should be such that evidence of progress and achievement can be derived each day with reasonable ease. Many careless assignments are of such nature that neither teacher nor pupil can demonstrate that the assignment is being accomplished. The learning indicated by the assignment must be either measurable or observable in some objective manifestation.

11. Pupil participation in selecting and developing assignments and methods of procedure is definitely desirable.
12. The expenditure of considerable time and energy on the part of teacher and pupils and careful, detailed planning are fully justified by the importance of assignments.

The Improvement of the Study Phase of Learning

The preceding discussion of the assignment has indicated some of the developments within the study process as well, the two phases being inseparable. The following outline is partly chronological and partly a series of changes in emphasis. All types of emphasis were found at given times. The improvements in study, it must be emphasized, still affect only a minority of schools.

Study Was at First, and Still Is, Unguided Memorization. The foregoing paragraphs show that the formal assignment of pages or topics, with no other aim than covering the text, still dominates the schools. Study was, and still is, largely an effort to remember the text material. Study guides, even those of a most formal, busy-work type, did not appear for a long time. Some textbooks today contain guides ranging from formal routine memory questions and chores to fairly good suggestions for sensible learning experiences related to the material. Study guides, as noted earlier, are of value in some situations but can easily interfere with the development of better processes in which procedures are co-operatively developed. The limitation to single texts, inadequate supplies, and overloaded programs have contributed to this backward situation. Part of the responsibility for conditions existing today, however, must be attributed to unawareness of the facts about learning, to inertia, or to flat refusal to do the work necessary for better procedures.

Introduction of Supervised Study. Failure increased as "all the children of all the people" began to come to the school designed for the more selected groups of earlier years. Investigations revealed that many had no conception whatever of how to study. Teachers were found who knew very little about the study aspect of learning. Increasing insight into the nature of learning, together with acceptance of the principle that guidance of study is a part of teaching, focused attention on the problem of aid to the student. The facts concerning individual differences also affected the problem.

Supervised-study programs sprang up everywhere. Elaborate administrative plans were made, daily schedules reconstructed, and facilities and materials provided. The high hopes of this period were, however, deflated by research and experience. Willing and enthusiastic persons had undertaken once again an educational reform for which they themselves were not ready. The careful, systematic training of the teachers should have come first or should have been carried on simultaneously.

The first reference to supervised study in the professional literature appears in the *Readers' Guide* during the period 1915-17. The peak of discussion was reached by 1925, and the topic practically disappeared from the current literature by 1935.[3] Study has been increasingly identified with learning; the development of study habits is regarded as a natural outcome of good teaching.

Supervised Study Took Various Forms. The earliest experiments with supervised study took the form of sets of study rules which were given to pupils with the hope that application would be made. Objection was raised even in the midst of these formal days,[4] with pleas that the identical aspects of study and learning be recognized, with teaching how to study regarded as part of the general teaching process.

The next development stressed administrative machinery and very probably delayed seriously a functional analysis of study and its improvement. This was the era of double periods, homogenous grouping, special remedial classes in reading, study coaches, special help sections, library study plans, homeroom supervision of study, the daily extra period for study.

The Processes of Study and the Techniques for Their Development Were Neglected. The emphasis on machinery, administrative devices, schedules, physical facilities, and the like, although necessary in part, resulted in delayed attention both to the nature of study and its improvement and to the provision of adequate instructional equipment and supplies.

Supervised Study Gave Way to Development of Study Habits. A large number of formal experimental studies were made which indicated that there was, under certain circumstances, a difference in favor of supervised study procedures. The difference was, however, so slight as to be negligible. The evidence, by and large, showed that average pupils were no better off, the superior students somewhat less well off, and that only the weaker pupils were aided. In the main, the experiments compared various administrative schemes and did not touch the heart of the matter, namely, the development of study skills and abilities.

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[3] Clare Rogers, *A Critical Analysis of the Literature on Supervised Study* (Unpublished Master's thesis, University of Southern California, 1938); William A. Brownell, "What Has Happened to Supervised Study?" *Educational Method*, XVII (May 1938), 373-77.

[4] Frank McMurry, *How To Study and Teaching How To Study*. New York: Houghton Mifflin Co., 1909.

The general efforts to develop study habits were very superficial. Some improvements were made, and some leads in the area of diagnosis of difficulty were uncovered but not followed up until much later. The silent-reading movement probably contributed as much as anything to better study procedures, chiefly through emphasis on the development of abilities and skills necessary to the proper discrimination and use of printed materials.

The modern period was ushered in by serious attempts to describe the study process. Fifty books, approximately, with about forty study manuals have been prepared, the best known being those by Bird, Brink, Brotelmarkle, Crawford, Frederick-Ragsdale-Salisbury, Kitson, Parr, Pitkin, Salisbury, Sandwick, Robinson, and Whipple. Brink in particular made an extensive detailed analysis of study habits.[5]

Two Major Lines of Development Mark Present Practice. Supervision of study in the original sense persists in many places and is of some value: the giving of aid or guidance to individual students or to groups studying at their desks. The recent developments are, *first*, emphasis upon the development of good study habits and abilities as a part of the everyday on-going class procedure, and, *second*, the organization of a separate course in "how-to-study."

A *third* development, namely, the improvement of reading abilities essential to the use of books, has received only incidental attention as far as study is concerned. The improvement of instruction in silent reading, as noted just above, is beneficial to study but is not enough. A considerable number of investigations show that large numbers of pupils fail or have difficulty in some or all curriculum fields because they cannot read the material properly. Increasing attention is being given to the improvement of reading, with special reference to curriculum areas, and also to the writing of text materials in terms of pupil maturity and experience. The extension of instruction in reading through high school and into college is slowly advancing and should be a major factor in improving study and learning. The chief emphasis should probably continue to be on the creation of conditions which facilitate the development of essential study abilities through the everyday on-going class work.

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[5] William G. Brink, *Directing Study in the Secondary School.* New York: Odyssey Press, 1937.

The data from studies of the separate study courses are, however, of interest. Mills[6] found that when a how-to-study class was taught as an academic subject, without relation to the courses being taken, or taught by someone not a member of the regular high-school staff, pupil achievement was not improved. Bird,[7] studying college-level courses, found that the courses were particularly beneficial with the more capable students. The latter point is the opposite of many findings on the elementary and secondary level and may be due to the greater maturity and clarity of purpose on the upper levels or to the superior quality of the courses which were given. Winter[8] found that college Freshmen showed that the greatest benefits were realized by students among the lower decile and a half. This is in keeping with the general findings in the lower schools. Pressey[9] gave systematic training in study habits required in typical college courses to groups of students who were about to be dismissed from college because of low marks. Approximately 80 per cent of the students so aided did satisfactory work in college from then on.

Emphasis currently is upon the diagnosis of difficulties in learning or in study with definite effort to aid the pupil in terms of his specific difficulty. Teaching for the development of study habits is more frequent than the separate study course. The principal abilities required in using books are being developed in the reading program, which includes not merely specific instruction in the reading period but also, increasingly, planning for integrating the reading abilities with other curriculum fields.

Home Work. The investigations show that the studying pupils do at home is not a significant factor in affecting pupil achievement. The most recent and extensive volume on study does not contain this topic in the index.[10] The facts are so contrary to general opinion that an explanation is of value. Study of the traditional sort, which is the form investigated, is, first, largely unguided, and, second, directed toward very limited formal outcomes. Modern methods of teaching, which identify study with learning and which utilize not one or two study activities but many varied experiences, present a different picture. The modern conception of learning envisages pupils attacking and studying problems of recognized importance, interacting continuously with the social and physical environment, and utilizing whatever resources will aid in the solution of their problems. Pupils will feel the need of doing these things outside the schoolroom and beyond school hours, including work similar to the more intelligent type of home assignments of some years ago. These activities will not even resemble home study in the formal school; nevertheless, they will constitute a significant phase of the procedure involved in study, i.e., continuous learning activities.

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[6] H. C. Mills, "How-to-study Courses and Academic Achievement," *Educational Administration and Supervision,* XXI (February, 1936), 145-51.

[7] Charles Bird, *Effective Study Habits,* p. vi. New York: D. Appleton-Century-Crofts, 1931.

[8] John E. Winter, "An Experimental Study of the Effect on Learning of Supervised and Unsupervised Study among College Students," *Journal of Educational Psychology,* XXVII (February, 1936), 111-18.

[9] Luella C. Pressey, *Research Adventures in College Teaching* (Bloomington, Illinois: Public School Publishing Co., 1927); Luella C. Pressey, "The Permanent Effects of Training in Methods of Study on College Success," *School and Society,* XXVIII (1928), 403-4.

[10] Brink, *op. cit.*

The Improvement of the Recitation

Two volumes published a third of a century apart symbolize the revolution which has taken place in educational thinking concerning the recitation. The McMurrys' *The Method of the Recitation* appeared in 1897; Thayer's *The Passing of the Recitation* in 1928. The recitation was, at the turn of the century, so important a member of the teaching-learning organization that it deserved a textbook all its own. Thirty years later the leadership had recognized that the typical formal recitation was completely outmoded and was an actual interference with desirable learning. Bossing stated the case aptly in 1935: "Among responsible writers in the field of secondary-school methods the re-citation concept of the recitation has been *passé* for twenty years."

Bossing's quotation, note, refers to writers and leaders. Vigorous, pointed criticism of the formal question-and-answer recitation for forty years has had little effect upon the so-called practical teacher. Precise surveys show, unhappily, that this type of recitation based on memorized material still predominates in school. The recitation as commonly used is probably the most fantastic of the vestigial remains of outmoded methods which still operate in the school.

We may note with historical interest that the first investigation, in 1912, somewhat shocked educational leaders.[11] Teachers were found regularly asking one hundred and fifty questions per class hour. In one class of twenty-two pupils, one pupil was questioned twice in two weeks, whereas a classmate was called on eleven times in the same period. In one small class of thirteen, one pupil was questioned four times, another eighteen times.

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[11] Romiett Stevens, *The Question as a Measure of Efficiency in Instruction.* Teachers College Contributions to Education, No. 48. New York: Teachers College, Columbia University, 1912. The original statistical study of questioning in the recitation. Extensive statistics and illustrations.

The facts should not have shocked the leaders then. The facts evidently do not yet shock thousands of experienced teachers, since the practices described are still in common use. And why not? A barrage of minute fact questions is a natural and legitimate procedure in schools where the aim of education is believed to be "covering the text," mastering content, memorizing masses of unrelated, fragmentary facts. Teachers who are not concerned with causes of pupil failure, not concerned with adaptation to individual differences, quite naturally use an accidental and uneven distribution of questions.

The modern conception of aim in education, namely, development of complex controls of conduct, as well as understandings, attitudes, appreciations, skills, and special abilities, demands a wholly different technique of questioning and of recitation. The transformation of the recitation is slowly advancing toward what may be called a working period.

Various writers from time to time pleaded for and described desirable improvements. The Herbartians introduced the "developmental method" along with their other improvements in the late '90's. The teacher led a discussion which enabled pupils to contribute from their past experience and thus develop topic or theme. References were consulted, as needed, to supplement the development. The terms *discussion, contribution recitation,* or *conversational method* appear in the literature.

The socialized recitation had considerable popularity about 1920. Other activities besides informal conversation were introduced. Reports were made, often preceded by group work, research, and participation in summarizing. Eventually other activities, both mental and motor, were included. A truly social situation was desired. The procedure was often seriously formalized but in best form it was a step forward.

The formal recitation is very slowly disappearing in the best elementary schools and in the core programs of the upper schools. A work period with a great variety of activities is taking its place.

THE EMERGENCE OF THE UNIT ORGANIZATION

The term *unit* means oneness, wholeness, unity. The factor determining unity may lie either in the subject matter or in the problem of the learner. Unity in subject matter lies in the logical arrangement of materials around a center or core which is found within the subject matter itself; this core may be a topic, theme, generalization, or any other major and significant item. Unity based on the learner's problem is found in the organization of materials and activities around this problem. Each utilizes pupil purpose, though often of different types.

Types of Units

The distinction between subject matter and experience units, as has been explained, is in part arbitrary. All units use both subject matter and experiences. The difference is in type of emphasis. Various schemes for defining and classifying units within the two areas of emphasis are found. One is about as good as another. The scheme below is submitted as inclusive of the chief ideas, always agreeing that a given title might be found in any of the groups depending upon the emphasis in organization. The experience unit cannot actually be identified by title but must be seen in operation. Some guidance will be given, however.

Titles of Subject-Matter Units. The titles of subject-matter units are indicative of the general form of organization. *Topical* units might include: "Transportation"; "The Period of Colonization of North America"; "The Development of Our Constitution"; "The Short Story"; "The Westward Movement." *Theme* or *generalization* units might be titled: "The Growing Complexity of Life Makes Co-operation Not Only Desirable but Imperatively Necessary"; "Tyranny Too Long Continued Breeds Revolt"; "Newspapers Play a Large Part in Molding Public Opinion"; "Populations Which Live in Cities Are Dependent upon Populations Living in the Country." *Survey* units might be: "The Age of Chivalry"; "The Coming of Science."

The Problem Unit. In the problem unit emphasis is placed upon pupil analysis and decision. A title, as has been indicated, is not a conclusive clue. Classroom procedure must also be known. Units which are actually theme, topic, or survey units are often called problem units because the theme or topic has been thrown into question form: "Why Did the European Nations Colonize North America?" This could be an excellent subject-matter unit, bringing to the children a number of generalizations valuable in viewing the current scene. "How Has Man Improved His Methods of Transportation?" is more likely to be a survey than a problem unit. "What Caused the Bill of Rights To Be Left Out of the Original Constitution?" is quite likely to be a problem unit since standard texts and references do not handle this item from the angle implied. Students would have to discover materials, read and compare, analyze arguments, and draw conclusions.

Units which the writer has seen handled as problems and not as camouflaged themes are available. "Our Fruit from Tree to Table," grew out of vigorous discussion among the children in an area wholly dependent upon fruit-growing. Their questions and arguments set off a train of events which was well organized by them and the teacher, dealt with new materials, and necessitated problem-solving decisions by the children. "How Can We Predict Tomorrow's Weather Accurately?" This could also be, as far as the title goes, an imposed subject-matter unit. Others which involve actual problem-solving and not mere acceptance of conclusions available included: "How Can We Detect Propaganda in Newspapers?" "Is It True That Newspapers Slant the News?" The unit, "Making the Transition from Veteran to Civilian," was a particularly realistic one for the college students who worked it out. "So, You Want a Job," led high-school Seniors into a series of worth-while problem-solving situations.

The problem-type unit, like the problem type of assignment, is definitely superior to the other types. A problem cannot truly be handed to a pupil as can a topic or theme. Teachers often make the mistake of arbitrarily stating the problem to the pupil. This is a violation of the essentials of the problem method. Teachers can and should aid pupils to see and accept problems that might otherwise be overlooked. Problems and the felt need for their solution should grow out of situations. The more real the situation, the more real the problem and the more urgent the drive for solution. The best type of teacher ingenuity and leadership is called for; the best type of learning experiences should be provided for the pupil.[12]

Illustrative Titles of Experience Units. Experience units cannot be so neatly labeled and pigeonholed since they develop in terms of given situations. An experience unit must be observed to be identified. The titles given below could also be found over subject-matter units or over a series of modern assignments. The difference would be in emphasis and in method of development. An experience unit is likely (*a*) to be organized functionally with disregard for traditional subject lines, (*b*) to be developed co-operatively by a group of learners which includes the teacher, and (*c*) to be organized by a group facing a new situation or problem. The titles of units which, upon observation, turn out to be experience units are more likely to be stated as problems which sound like real life difficulties rather than problems taken from and based on a text treatment. Overlap with problem units exists. Several of those listed could have been developed either as problem or experience units with emphasis upon total experience, upon co-operative development throughout, and always with intimate connections with current needs and activities. The writer has observed and participated in the development of several units handled on the experience basis. The immediate local situation which initiated the unit is apparent in most of the titles, hence discussion will be omitted in the interests of space: "How Can We Organize and Operate a School Library?" (Followed a gift of a considerable collection of books.) "How Can We Start and Operate a School Newspaper?" "Getting It the Hard Way" was an interesting inquiry by children in a less-favored district into the effects of early escapades and delinquency on the chances for employment later. "A Handbook for Our Junior High School" sounds like a faculty-imposed project but actually grew out of repeated discussions and complaints. The book was developed with very little direction from the staff. "How To Get There in Our City" started out to be a guide to local transportation but became a good study of the community. "Taking Care of the Furniture in Our Home" and "Meeting Community Needs in . . . . ." grew out of every-day discussions. One that stirred a community pretty thoroughly before the children were through was, "Why Is There So Much Fighting in Our Suburb over the Veterans' Housing Project?"

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[12] William H. Burton, "The Problem-solving Technique: Its Appearance and Development in American Texts on General Method," *Educational Method,* XIV (January, February, March 1936), 189-95, 248-53, 338-42. A detailed historical account of the emergence of problem-solving as a method of learning and of teaching. Shows progress in improving the method. Other similar studies are needed.

Source Units or Resource Materials

This term is increasingly used to designate a volume or series of volumes which contain large amounts of materials, possible activities, and other suggestions for all aspects of the teaching situation. The teacher uses these volumes as handbooks to aid in developing units of any type. Courses of study are, in many places, being organized as a systematic and sequential series of these handbooks or source units.

General Outline for Planning and Developing Teaching Units

The unit organization cannot be reduced to an easy series of processes as was the assignment-study-recite-test process. A general outline is, nevertheless, observable.

1. Objectives are stated.
  a) The teachers' objectives are the understandings, attitudes, appreciations, general abilities, and skills which it is desired to develop in the pupils.
  b) The *pupils'* objectives are questions, problems, topics of interest, and purposes of the learner.
  c) The teacher will participate in developing pupil objectives. Guidance will be exercised in the avoidance of a large list of trivial questions. Teachers will suggest, and pupils will welcome, questions and problems for investigation which are significant and of which the learner could not know on the basis of his present knowledge.

2. An overview is given.
  a) The overview is a brief statement of the nature and scope of the unit. It may consist of (1) a description of the unit in running discourse, (2) an outline of leads in terms of topics, themes, or generalizations, or (3) an outline of leads in the form of actual or probable pupil questions, problems, or proposals.

3. An approach is developed.
  a) A probable introduction or approach is outlined. Two or three or more may be indicated. The teacher endeavors to make clear just how she proposes to get the particular teaching-learning situation under way.
  b) The pupils' objectives usually develop explicitly, whereupon the procedure turns to planning and working out the plans.

4. The working period is outlined.
  a) Two phases are recognized, planning and working. It must be emphasized that in actuality there is a continuous on-going process. The approach, the planning, and the working period are not separable but merge, one into the other.
  b) The teacher may plan in advance what to do about the questions and problems which were developed and listed during the approach, or teacher and class may plan co-operatively. In either event, questions, exercises, readings, experiments, excursions, reports, and interviews are planned. Group discussions or socialized recitations, and individual and group reports are used as needed. Committees are set up. Study guides and worksheets may be outlined co-operatively. Exercises will appear for organizing, summarizing, memorizing, practicing, or encouraging creative effort. Possible methods of diagnosis of difficulties, of special disabilities, and possible remedial measures are indicated.

5. Evaluation techniques are planned.
  a) The teacher will indicate how he proposes to gather evidence showing that the objectives are being achieved. Any and all kinds of tests and evaluational techniques will be used as needed. Pupil participation in all of evaluation will be encouraged. As indicated elsewhere, careful training in methods of appraisal is necessary either in the preservice or in-service education of teachers.

6. Adequate instructional equipment will be noted and its specific use within the unit indicated.
   a) A bibliography of books useful to the teacher and one of books useful to the pupil will be included. The books and, in some cases, the passages must be related to given objectives and learning experiences.
   b) Lists will be given of materials, exhibits, tools, realia of all types, audio-visual aids available in both school and community, together with sources.

The foregoing outline for unit organization would appear to many honest observers to be equally applicable to the assignment procedure. The organization based on assignment can indeed be very flexible and co-operative as already stated and as will be shown immediately below. Differences in emphasis, in organization, and particularly in the actual processes of instruction do exist as the outline presented earlier in this chapter attempts to show. The writer does not wish to set up sharp contrasts but rather to stress selection of subject matter and of learning activities which make sense to the learner. The paragraphs immediately following carry this point further.

Learning Activities, Typical of Units Based upon Pupil Problems, Can Be Used also in Subject-Matter Units and within Good Assignments. Assignments based on subject matter and subject-matter units must of necessity be used in many places, but the best aspects of experience units can be included. The chief general principle is that pupil participation, suggestion, and judgment be invited at every turn. The principle and related items may be summarized:

1. Discover and develop pupil needs, purposes, and interests through observation of behavior, informal conversations, direct questioning, telling something about the organized materials which the teacher knows he must "cover."
2. Develop co-operatively with pupils:
   a) The center or centers of interest within the materials thus discovered.
   b) The leads, themes, topics, or problems into which the center of interest can be organized.
   c) The selection of materials and activities.
   d) The delegation of responsibility for various materials, activities, contributions.
   e) The continuous evaluation of materials, learning experiences, suggestions, conclusions, etc.
3. Provide direct experience where clearly essential; utilize all the resources of school and community in supplementing the necessarily vicarious experience of the subject-matter sequence.
4. Aid different individuals to find opportunities within the general group activities for their unique abilities and ambitions.

5. Aid the learners progressively to see the very nature of the processes by which they learn, thus aiding them toward independence and transfer.
6. Aid and guide the learners constantly toward the acquisition of those functional learning outcomes derivable from subject-matter organizations.

Improving the Teacher's Use of Instructional Organization

Well-trained, earnest teachers will be found using any one of the schemes skilfully. The good teachers may improve within the general method which they are using, or they may, under favorable conditions, change from one basic scheme to another deemed to be better. The stimulation of teacher growth in classroom for both good teachers and the great numbers of mediocre and poor teachers is an inescapable responsibility of the entire staff.

Improvement will be stimulated regardless of which type of organization is favored if supervisors and teachers will keep certain questions in mind as they develop instructional situations.

a) Are the problems to be attacked of basic importance?
b) Are the problems of immediate value or need to pupils? Are they of such nature that pupils will readily see values and needs and make the problems their own?
c) Are the problems within the range of pupil maturity and experience, thus having some probability of successful attack? Are they of sufficient challenge to stimulate further growth?
d) Are there sufficient and varied sources to which pupils can turn, such as books, references, audio-visual materials of all sorts, community resources of many types, both personal and material?
e) Are the learning experiences and activities which are planned for accomplishing the desired results the best that can be provided in the given situation?

In improving any kind of teaching or learning, the problems and purposes are central; materials and experiences are the means.

Efforts to aid teacher growth of whatever kind must be carried on with due regard for the experience and convictions of those teachers. Teachers should not be asked, except for sound reasons, to abandon or to modify principles and practices in which they have confidence. Great changes are not expected overnight. First steps forward are short. Improvement at first will be concerned with whatever scheme and type of device the teacher is now using.

The growth of the teaching personnel will be cultivated slowly and naturally through experience. Growth is not fostered by authoritative order nor by the absence of competent and friendly guidance. Individual differences are as important in dealing with teachers as in dealing with children. Growth within any staff will progress unevenly as regards the individuals in the group, and this must be accepted.

Co-operative effort in the stimulation of improvement can usually be secured if careful attention is given to building the teachers' feeling of security with the new practices as they develop. The entire personnel will participate. The idea that teachers may take part in the constructive programs designed to improve the total setting for learning is relatively new. The professional attitude in education is, however, growing. Evidence derived from improvement programs throughout the country indicates that a very effective aspect in improving the situation is participation by the staff in planning and executing the program. Changing one's teaching for the better is neither complex, difficult, nor frightening, if it starts with the known and the familiar.

A number of manageable items may be listed for initial attack, no matter whether we are undertaking to improve the assign-study-recite procedure or the unit organizations. In each case we wish to bring about:

1. Better connection and relationship between the needs, continuing interests, and maturity levels of the pupils and the materials and learning experiences of the school.
2. Increased use of sound purposes as the core around which learning situations are organized. Purposes will be found both in curriculum areas and in the personal and community experiences of the pupils.
3. Greater pupil participation in planning and carrying on the learning situations of whatever type.
4. More adequate provision for individual differences through greater diversity and variety of learning experiences and of materials, particularly the provision of reading materials on levels appropriate to the students' reading ability.
5. Greater emphasis upon interaction with other persons, with the community, and with life; greater use of community resources, both personal and material.
6. Better evaluation of all types of outcomes, which in turn brings better statements of objectives; increased pupil participation in evaluation.

Two dangers to be aware of are (*a*) formalism which may overtake the most dynamic practices, and (*b*) superficial, half-baked treatment of crucial items under any of the plans.[13]

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[13] One state department program of curriculum improvement has issued a separate bulletin of 121 pages devoted wholly to the problems involved in improving teaching through the stimulation of teacher growth on all levels. The bulletin contains a wealth of specific illustrations used by all levels of teachers, together with a brief compact summary of principles. *A Forward Step*. Curriculum Bulletin No. 7, 1948. Augusta, Maine: State Department of Education.

ORGANIZING FOR THE ACQUISITION OF SKILLS

The types of organization that have been described deal chiefly with the learning of meanings, understandings, attitudes, appreciations, and the many personal-social-moral traits and behavior patterns which constitute the controls of behavior. The learning of skills is related to these general methods but needs further organization for itself. Practice periods or drills are inescapable in the acquisition of skills. Research shows, however, that drill as managed in many schools is wasteful, if not actually detrimental to learning. The poor use of drill can be avoided easily if a few simple principles are followed.

First, skills are not isolated mechanisms which can be learned apart from real situations and then automatically applied in real situations. Skills are extensions of meaning; procedures for making understandings operative. Skills are learned better, therefore, when closely related to meanings. A second closely related principle is that skills are not acquired readily in advance of need or of meaning and familiarity. The repetitive practice or drill through which facility develops must be preceded by a period of integrative practice. Facility is not the aim of this preliminary activity; rather, familiarity and insight are sought. The integrative period should include several contacts, some tentative trials, conversation about or more formal diagnosis of mistakes, questioning, handling, "fooling around." Repetitive practice is then accompanied by increasing insight into meaning and pattern. The time for and number of repetitive drills are reduced under these conditions. The term "trial-and-error" is, in some quarters, being dropped in favor of "retrial-with-insight." The evidence seems to warrant special emphasis on insight and understanding in all practice. Third, skills are not, as commonly thought, fixed unchanging routines which may be acquired through unthinking repetition. Skill performance is inherently variable, variable from person to person and from situation to situation, and differs in terms of position in which it is performed. Fourth, research shows that children who have had considerable contact with drill which grew out of their own needs, i.e., was meaningful, will acquire a principle very important on upper levels, namely, that drill or practice is a necessary and sensible activity. The end in view, or the use of the skill, removes drill from the dull routine of repetition and gives it meaning and sense.

Research studies uphold the fact that children are likely to acquire skills with reasonable ease in a meaningful setting. It has been shown clearly that mere repetition does not increase skill but that repetition with insight does. Excessive drill without meaning may actually retard the acquisition of a skill. Schools, even when operating on a fairly radical experience-unit basis, should organize separate periods for drill or practice. Pupils in good situations recognize the necessity and usefulness of drill and are able to apply skills in new situations readily.

The Testing and Evaluation of Learning Outcomes

The measuring and evaluation of pupil achievement and of pupil growth is an inescapable aspect of all instructional organizations. One chapter could well be devoted to this problem, but the following brief summary will suffice. Supplementary references will be found in the bibliography at the end of this chapter.

The learning and behavior of the pupil is affected by many types of experiences in addition to the organized learning experiences within the school. Experiences within the community, the neighborhood, the home, with the church, with recreational facilities, with civil authorities, with business, and with many other agencies all affect the learner. Experiences within and without the school may be detrimental to learning as well as beneficial. The school, nevertheless, must face the problem of evaluation courageously. The final evaluation can come only as the pupil meets the situations of real life during and after schooling. Continuous evaluation, however, must go on as an integral part of the instructional process.

Valid Evaluation Today Is Much More Difficult Than Formerly. Traditional practice consisted usually of a final examination supposedly of the essay type but usually calling only for verbal memory. A number of shorter factual quizzes occurred during the term. Standard tests for the measurement of learning of fact and skill appeared during the first quarter of the century and are widely used. The current period is marked by a significant development: the effort to devise procedures for evaluating growth in understandings, attitudes, appreciations, and both general and specific abilities. Herein lies the source of the factors which seriously complicate the problem.

1. The scope of evaluation has been greatly expanded. Early emphasis upon testing fact and skill outcomes has been supplemented by attention to evaluating such outcomes as understandings, attitudes, appreciations, values, and other personal-social-moral traits which control conduct.
2. The outcomes to be evaluated are complex integrations of many items.
3. The outcomes to be evaluated are difficult to state in unequivocal language.
4. Directional progress goals must be related eventually to relatively fixed standards. Standards of achievement and growth must of necessity be

adapted to levels of maturity and to individual differences; hence there must be flexibility in the appraisal of pupil growth. The learner is to progress along lines indicated by the aims and objectives in the given situation. The standards move constantly upward with the maturing learner. Eventually current social standards enter as mature levels of the goals which pupils have been progressively achieving. Efforts to evaluate, in terms of arbitrary standards, the growth of immature children with differences in abilities, interests, and rates of growth result in serious disturbances of mental hygiene. Children allowed to progress through a series of directional progress goals and standards will come to see quite naturally the necessity for achieving socially desirable levels. Evaluation must be carried on with these facts in mind.

5. The outcomes to be evaluated are often stated in general and abstract terms, but pupil behavior is specific and concrete. This calls for the gathering of specific data from observations of behavior and then making a judgment, i.e., evaluating that behavior as indicative or not indicative of growth in given values.
6. Modern evaluation within the everyday on-going classroom situation is continuous and adjusted to the nature of the learner. The close of a unit or series of assignments will include an appraisal of the degree to which the objectives and purposes of the unit or assignments have been achieved.
7. Modern evaluation is participatory; everyone from test technician to the pupils themselves takes part. It is of basic importance to have pupils learn to evaluate objectively their own achievement. Evaluations should be included in which pupils do not participate, but for which, on the basis of their experience, they can clearly see the why and the how.
8. The techniques of modern evaluation are such that the teachers should be given definite training in the development and use of the processes. Children should be given continuous opportunity to evaluate materials, classroom procedures, their own achievements and their growth.
9. Objective measurement and subjective evaluation are both essential. The current scene is marked by considerable development in the area of subjective evaluation. New instruments and procedures are constantly being developed.

The Types of Instruments Available. Older-type tests and evaluational examinations are still widely used. Improvements upon these older forms are available. Several types of instruments which have little relation to the older processes are also available. Some of the items here listed are useful in experimental studies rather than in everyday classroom situations.

1. Traditional essay-type examination with general questions
2. Improved essay-type examinations with definite questions designed to sample adequately the learning outcomes and eventually refined through scrutiny of results secured through repeated use

3. Standard tests
   - *a*) Intelligence tests
   - *b*) Achievement tests
   - *c*) Aptitude tests
4. Home-made objective tests (sixteen types with approximately thirty forms)
5. Problem-situation tests
   - *a*) Direct
     - 1) Experiment to be performed
     - 2) Life situation to be met (actual)
   - *b*) Indirect
     - 1) Improved essay examination
     - 2) Objective tests requiring judgment
     - 3) Life situation to be met (described)
6. Behavior records
   - *a*) Controlled situations
     - 1) Check lists, rating scales, score cards, codes
       - (*a*) Personality traits
       - (*b*) Behavior
       - (*c*) Attitudes, opinions, interests, etc.
     - 2) Guess-who tests
     - 3) Time studies of given activities
     - 4) Camera for still or motion pictures
   - *b*) Uncontrolled situations
     - 1) Diary or log, with or without guiding outline
     - 2) Anecdotal record
     - 3) Camera for still or motion pictures
7. Inventories and questionnaires
8. Interviews
9. Analysis of creative products
10. Reports, exhibits, a play, a debate, or any other student construction
11. Case studies

The General Procedures Used in Measuring and Evaluating. An adequate statement would cover many pages. The outline here may be supplemented by many easily available references which are listed in the bibliography.

1. Determine what is to be measured or evaluated. Many traditional schools waste much effort because no clear statement is ever made as to what is being tested. Many older examinations were shot-gun affairs designed to "cover the course." The pupils, unfortunately, adjust to this procedure and, in these muddled situations, set up objectives which they study for but which are not educative. Many modern schools, too, often fail to define objectives sharply or have too many mixed objectives. Personal reports of material or spiritual growth are accepted uncritically. The old-fashioned exhaustive fact examination and justification by faith are equally

unreliable. The first step, without which evaluation is quite ineffectual, if not actually detrimental, is to define clearly what is being evaluated.

2. Define the objectives in terms of pupil behavior. The stated outcome must be translated into specific pupil behaviors which are thought to indicate achievement or growth in terms of the stated outcomes. Many traditional teachers do not at any time derive valid evidence concerning the outcomes of their own teaching. Great confusion may be noted concerning the very nature of the outcomes and concerning the valid evidence relating to those outcomes. Appreciation is often "tested" by procedures which are actually tests of memory and not of appreciation at all. A great amount of evidence shows that the achievement of one objective does not at all guarantee the achievement of another. Each must be taught for and evaluated separately.
3. Select or design an instrument: Collect test situations appropriate to the outcome.
4. Record the results of testing or evaluating.
5. Evaluate the evidence and make a judgment concerning pupil achievement or growth. This step is often omitted, the mistaken notion being prevalent that the recorded data themselves constitute the evaluation.
6. Evaluations must take into account the pupil's individual characteristics, background, and the immediate environmental factors.
7. Evaluations should in themselves provide diagnosis of difficulties or be followed closely by such diagnoses and by remedial assistance and guidance. Fully as important, there should be changes in the instructional design (materials and methods) to prevent learning difficulties from arising.

INSTRUCTIONAL MATERIALS AND EQUIPMENT

The strongest possible pressure should be exerted by teachers to secure as adequate a provision of supplies and equipment as the local financial situation will permit. Administrators and supervisors can effect improvements in instruction in considerable degree by increasing the budget for these materials as much as is possible in the given circumstances. Communities which are able to purchase adequate supplies but which limit expenditures sharply are saving money at the expense of their own children.

Among the necessary items are classroom libraries; central school libraries, including books on different levels of reading difficulty and many varied types of audio-visual aids; motion pictures, filmstrips, and stills, together with the necessary machinery for use of these aids. There should be crayons and paint, clay, wood, cloth, and other materials for illustration and construction, together with necessary workbenches and tools. Recorders and radio equipment may be included where resources permit.

The Kinds of Instructional Aids Available. The wealth of materials now in use in good school systems may be roughly classified as follows:

Books, periodicals, bulletins, pamphlets
Pictures (photographs of persons, places, processes, reproduction of masterpieces of art)
Motion pictures, with or without sound
Lantern slides and still films
Charts, diagrams, graphs
Cartoons
Maps and globes (relief, product and industry, population, and rainfall maps and many other special-purpose maps in addition to typical physical-political ones)
Phonograph records
Exhibits (specimens of fauna and flora, models of machinery and places, industrial and natural products)
Posters
Museum collections
Radio presentations
Stereographs

Each of these classifications contains from two or three to scores of subgroupings. The number of actual materials is almost limitless. Certain apparatus is required:

Motion-picture projectors and screens
Sound projectors
Phonographs
Radios
Blackboards
Bulletin boards
Sand tables
Museum rooms and exhibit cases

The relation of these types of apparatus and the corresponding materials to the scale of vicarious experiences is clear.[14]

The following summary shows the types that can be secured free or at small cost by any school:

1. Bulletins, pamphlets, catalogues. Many book catalogues give descriptions of books, information about authors and illustrators, and illustrations that will be interesting and stimulating for children's use. Such catalogues

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[14] Several paragraphs here have been borrowed from the 1947 revision of Barr, Burton, and Brueckner, *Supervision*, pp. 668-69. (New York: Appleton-Century-Crofts Co.) See also chaps. x and xiv, which contain extensive discussions of supplementary materials.

often give an acquaintance with books and writers which may not be acquired in any other way. Children enjoy looking over book catalogues, selecting books for Christmas gifts or for the library order. Picture and toy catalogues may be used in the same way.

Travel bulletins add interest to work in geography and are valuable in developing units of work having to do with industries, with different sections of the United States, and with foreign countries.

Many bulletins published by departments of state and national government and by state universities will be found helpful in classroom work. It is undesirable to have every pupil write for the same material or to have each succeeding class collect materials that can be preserved from year to year as a part of the permanent school collection of materials. Pupils may write for some of the material as it is needed, but much of the information will have to be located and often secured before the group begins the unit of work in order to prevent too much loss of time. Requests for materials should be written on school stationery and should be approved by the teacher. Children should write for definite information or material, not make a general request for information or bulletins.

2. Magazines, papers (state, local, Sunday, foreign). These offer rich materials for instructional use. Feature articles; accounts of special exhibits; reviews of books, plays, and movies; radio programs, and the like, may be clipped and used for the bulletin board and later for the files, as a contribution to the material under some special unit or topic used in the curriculum of the school.
3. Posters of railroad and travel bureaus, maps, and charts. These furnish graphic and often colorful illustrative materials. Maps are being used in many ways to show places of historic interest, sports and recreation centers, flowers and herbs grown in different localities, weather conditions, topographic survey. Graphs may be obtained showing production and distribution of products, market analyses, trends in economic life. These are valuable as source materials, presenting the information in a manner which is not possible in the textbook.
4. Prints and pictures. Copies of famous pictures, colorful prints from various foreign countries, pictures from magazines, the picture supplement of the Sunday papers, advertisements, Kodak pictures, post-card views of points of historic and geographic interest, of costumes in different lands, and of fairy tales and nursery rhymes have a very real place among instructional materials.
5. Tapestries and wall hangings. Prints and pictorial cretonnes, which may be bought by the yard, hemmed, and mounted, add a note of color to the classroom and furnish illustrative material for transportation and other units of work.
6. Exhibits. Silk, rubber, and other manufactured products; collections of minerals, stamps, pictures, books, and the like add vividness and reality to the instructional program.

7. Properties and costumes. Such items used in plays and programs may go into the properties box of the school, the materials to be used as need arises in school programs and entertainments.
8. Programs. Radio, theater, lecture, exhibit, museum, garden club, and book-club programs offer suggestions.
9. Reviews of plays, movies, and books furnish current information.
10. Biographical sketches. Information about the lives of authors, writers, and actors may be obtained from such material.
11. Mimeographed units of work and teacher-and-pupil-made helps. Such materials meet immediate needs.
12. Annotated bibliographies of source material and of available illustrative materials. These are materials which should be preserved for reference.

Sources of Free and Inexpensive Material

1. Commercially published bulletins:
   "Free and Inexpensive Educational Materials, Including Sources of Visual Aids," Special Report No. 17. Chicago: Quarrie Reference Library (35 East Wacker Drive). Constantly revised. $5.00.
   "Sources of Free and Inexpensive Teaching Aids." Ontario, California: Bruce Miller (Box 222). Constantly supplemented. $5.00.
2. University publications:
   "Free and Inexpensive Materials," Curriculum Bulletin No. 4, September 1, 1940. Eugene, Oregon: Hugh B. Wood, Co-operative Store, University of Oregon. 25 cents. This is an annotated bibliography of bibliographies, of sources of pamphlets, and other teaching aids.
   "Enrichment materials for Teachers" (Robert DiKiefer), Service Bulletin No. 7. Evanston, Illinois: Northwestern University, May, 1941.
   "Materials for the Classroom." Gainesville, Florida: University of Florida Curriculum Laboratory.
   "Free and Inexpensive Learning Materials." Field Study, No. 9. Nashville, Tennessee: George Peabody College for Teachers.
   "List of Free Materials." Collegeboro, Georgia: Georgia Teachers College.
3. Government bulletins. (Sampling only. Others are available from a number of government departments.)
   "New Government Aids for Teachers." Appears in *School Life* from September, 1937, to June, 1940, but is available in pamphlet form as a reprint. Washington: United States Office of Education.
   "One Dollar or Less: Inexpensive Books for School Libraries." Prepared by E. A. Lathrop. Pamphlet No. 88. Washington: United States Office of Education, 1940. 5 cents.
   "Children's Books for Fifty Cents or Less." Prepared by Dorothy Cadwallader. Washington: Association for Childhood Education, 1943. 25 cents.
   Free posters on animals and animal husbandry. Washington: Bureau of Animal Husbandry, United States Department of Agriculture.
   "Radio Programs for School Listening." Washington: United States Office of Education, Federal Security Agency.

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CHAPTER X

APPLICATIONS OF LEARNING PRINCIPLES TO THE IMPROVEMENT OF TEACHING IN THE EARLY ELEMENTARY GRADES

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INTRODUCTION

Classroom teachers, by and large, are apt to be somewhat impatient of what they often refer to as "just theory." They want to move on at once to the practical applications. Many are prone to skip over statements of basic principles rather lightly and uncritically so as to hurry on to more specific recommendations for teaching practice. Some are quite willing to omit the theoretical backgrounds entirely if someone else will just give them his plausible version of "what to do in the practical situation." Sometimes such procedures work out all right; more often, they do not. The difficulty is that "the practical situation" is really never the same for any two teachers. Variations among pupils, variations among the teachers themselves, and variations among instructional materials are some of the barriers to the attainment of desirable results by teaching according to specific "what-to-do" prescriptions. No matter how conscientiously teachers may seek to apply such prescriptions, it will still be true that *what* is to be done in adequately guiding children's learning in any individual situation must depend upon other considerations such as *why* and *how* and *by whom* and *under what circumstances* learning is expected to take place.

A much more hopeful approach to better teaching is based upon recognition and acceptance of existing variations among learning-teaching situations plus an understanding of the underlying principles of the psychology of learning. Perhaps the most significant of all the variations mentioned are the differences among the children who are to do the learning. A teacher's success is, to a large degree, conditioned by her competency as a student of the children she teaches, individually and collectively.

In summarizing the present state of our knowledge about how learning takes place, the authors of chapters i-viii necessarily touch repeatedly upon this inescapable fact: The learner's needs, interests, and purposes, the learner's innate and acquired abilities, the learner's attitudes, likes, and dislikes, the learner's environmental background, the learner's past and present experiences, all determine in no small degree what he can learn, how he can learn, and how well he can learn. The present chapter assumes, therefore, that study and understanding of children, individually and collectively, is an essential background for the consideration of the learning process.

Against the background of a broad yet penetrating understanding of children, the teacher can proceed with profit to a careful study of what is known about how learning takes place. This chapter represents one teacher's attempt: first, to select certain basic facts, generalizations, and principles concerning the learning process which seem particularly pertinent to teaching in the early elementary grades; and second, to emphasize by elaboration and by illustration some of the implications of those fundamental concepts about how people learn.[1]

The discussion is organized around four major considerations of any teacher who sets out to guide children's learning experiences: (*a*) goal direction, (*b*) the setting for learning, (*c*) the developmental character of learning, and (d) evaluation of the learner's progress. In other words, we shall seek to present some answers to these four big questions: (*a*) What are we trying to accomplish? (*b*) How can we best set the stage for accomplishing the selected purposes? (*c*) How does the learning process need to be adapted to the individual learner's present status and sequence of development? (*d*) How shall we check up on the effectiveness of the learning process?

GOAL DIRECTION IN THE EARLY ELEMENTARY GRADES

Some primary teachers may not consider young children's goals of much importance so far as the teachers' work is concerned. Accordingly, they may, intentionally or unintentionally, ignore many obvious clues to pupil motives. But to ignore pupil motives is to behave in as naive a fashion as Mary, the third-grade child who insisted, when she first heard of gravity, that she did not believe in it. When Mary rolled past the edge of her bed one morning, gravity operated as well, and the fall hurt just as much as if she had "believed" in gravity. Teachers of young learners as well as older ones, ignoring the importance of pupil motives, also "fall down" as automatically as Mary, despite their assurance that childish goals are of small importance. The chief tragedy, however, is that not only does the teacher get hurt in such a situation, but her pupils must share and perhaps bear the main brunt of the consequences.

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[1] The present chapter gives by no means a complete coverage of implications of preceding chapters for teaching in the early elementary grades. Some implications have been omitted to avoid unnecessary duplication of their adequate discussion in succeeding chapters (especially chap. xi, which deals with the later elementary grades); others are omitted for lack of space.

Teacher Goals and Learner Goals

Too often, perhaps, the only relationship which has been recognized between teacher goals and learner goals has been the assumption that pupils should accept and adopt as their own the teacher's goal. Teacher and pupil goals need to be related in a much more fundamental sense than always expecting the child to adopt the behavior which will "please the teacher." Many teachers would do a much better job if they realized that in a certain sense the teacher's goals should also "please the pupil." After all, if the learning is to be successful, the person doing the learning should certainly know what it is that he is trying to accomplish.

Teacher and pupil ideas of a goal, even when it is a fairly simple, impersonal sort of goal, may vary rather widely. For example, a first-grade boy was trying for the first time to write the number symbol "7." The teacher had written a "7" and Jack tried to copy it. First he drew what an adult would consider the second stroke of the symbol; then he drew across the top of it what we might consider the first stroke. He drew the stroke in such a fashion as to make the whole symbol look much like a capital "T." The teacher observed the product of his efforts and said, "Jack, that isn't a '7.' The top part is wrong." Jack looked up at her with a puzzled expression on his face and asked, "It doesn't hurt if it goes east, does it?"

To Jack the "7" was "good enough" even if the top stroke did "go east." To the teacher, it was not "good enough." The big question in such a situation is not a matter of blaming Jack for not having a more mature idea of the product to be produced, but rather: "How can Jack be led to revise his idea of the acceptable product so that it will more nearly agree with the standard which will later be required of Jack? The teacher knows that his T-model "7" will cause confusion to both Jack and others if not revised so as to correspond to the conventional number symbol. It will not suffice to scold, "Now, Jack, you know that what you have written doesn't look like the one I showed you. Don't be careless. Make another one, and do it right this time." Jack may try again to "do it right"—that is, please the teacher—but if he has not seen wherein his idea of the expected "7" differs from the one the teacher wrote, he may produce another unacceptable one (from the teacher's point of view). Jack was writing "7," not because he needed or wanted to record the "7"-idea but because the teacher said he should copy her "7." He will not see the importance of the correct form until he sees that the shape of what he writes affects what it says to a reader.

Even when the goals set for the child are more mature and more desirable in the long run than his, the teacher must still accept the responsibility for helping the child see wherein the goals planned for him are different from those he has chosen and also why he will profit from modifying his goals in the direction he then understands is desirable. (See later discussion of the developmental aspects of learning.)

Teachers often react rather skeptically when first challenged with the concept that the learner's purpose is central to success in learning —that is, that there is no learning without motivation of the learner. One typical reaction is that of Miss Jones, who says, "I don't believe it. I'm positive that Billie Smith didn't *want* to learn his spelling words yesterday, but he learned them before he went home. *I made* him learn them even if I did have to stand over him for half an hour after school." Miss Jones fails to see that Billie's motives still entered into the learning situation. Let us grant that Billie did not particularly want to learn the spelling words; let us grant that he did really learn them before he left school. Even so, Billie perhaps did want to play cowboy with Jack, Joe, and Tom. To play cowboy, he must get out of school. To get out of school, Miss Jones has convinced him he must spell those words. *So* Billie is motivated to learn those spellings, and he does.

Teacher goals (e.g., for Billie to spell a certain list of words from a certain page in a certain spelling book) and pupil goals (e.g., to have fun playing cowboy with Jack, Joe, and Tom) both become inescapable factors in the learning situation. In this case, contrasted with the preceding example, it seems that perhaps the teacher's goals need modifying. Furthermore, we have here an illustration of an all-too-prevalent school situation in which the directions of motivation (teacher and pupil) are opposite—the activity in question being directed *toward* the teacher's goal and *away from* the pupil's goal. Ideally, Miss Jones and Billie should both be working toward mutually acceptable goals—in this case, better spelling by Billie of words he needs to use when he has ideas he wishes to communicate through writing. Instead, Miss Jones pushes Billie toward spelling a certain list of words, and Billie reluctantly turns his efforts in that direction because he sees that he can only work toward his goal (playing cowboy) by working his way out of or away from the spelling task. They are like seat-mates who travel together on a bus, one eagerly journeying toward a happily anticipated reunion with a friend, the other not caring where he goes just so it is away from the scene of an unhappy experience he wishes to escape. Teachers and pupils travel much more congenially down the road of education when they work toward goals which lie ahead for both.

Boys and girls in the early elementary-school grades are especially adept with the question "Why?" "Why are we doing this?" "Why do I have to learn that?" "Why do I have a shadow sometimes and not all the time?" "Why do we have to take turns?" Though harried adults are often prone to wish the word could be removed from child vocabularies for a season, the "why's" of children can be at once a rich source of teacher understanding of pupil motives and a guide to increasingly better types of motivation toward school learning. The "why's" of young children are ever-present reminders of goal-directed learner activity, seeking answers to real child problems.

The current emphasis upon the idea that children in the early school grades as well as later must "read to learn" as well as "learn to read" is a recognition of the necessity for reading to be a purposeful process of seeking ideas, facts, information, knowledge, and enjoyment.

The above examples of Jack and Billie may have given the impression that children in the early grades are prone to disagree with their teachers. This is not the case. Younger children seem to be especially inclined toward looking up to their teachers with admiration, respect, and affection. Their pronounced needs for affiliation and for approval (chap. ii) make them especially willing to do what will please the object of their admiration. Therein lies a special responsibility for primary teachers to guide their willing followers in the proper direction and to wean them gradually from too much dependence on the teacher's idea of what is to be accomplished. Of course, it is easier in some ways to have children do what the teacher thinks should be done, but the best learning situation includes much attention to and cultivation of what children see as desirable and worth while.

Pupil Participation in Selection of Goals and Planning toward Achievement of Goals

Do children of six, seven, and eight years of age "know their own minds" well enough to participate in selecting learning goals? Do they know well enough "what they are after"? There are two answers to these questions: First, in many ways, they do know what they are after; second, if they don't know, they can learn if adults will help them to choose goals which are suitable in light of their present needs, abilities, interests, and past experiences.

Younger children in our schools need to have more immediately attainable goals than many that would be suitable for more mature pupils. Anyone who has taken an extended motor trip with young children recognizes the impatient refrain, "When do we get there? Aren't we there pretty soon? How much longer will it take?" They have limited notions of long distances and remote destinations. They want to "get there" quickly. If their traveling companions set up some intermediate destinations—"We'll be in the next town in a few minutes"; "That sign says '100 miles to Kansas City'; that means we are half way"; "Just two more towns and we'll stop for lunch"—the children feel more at ease and less impatient; they feel they are getting somewhere.

That is why planning periods in the earlier school grades have to come more often and should immediately precede (to plan) and follow (to evaluate and replan) the work period. Longer term goals must be supplemented by shorter-term goals. A whole big mural on transportation is to be painted by a second-grade group. They recognize the total task as a long-term project, but their learning as they work on it daily is enhanced and better motivated if they can set out to accomplish, and have a chance of completing, a small part of the whole task—such as drawing in a sailboat to represent one phase of water transportation.

Learners of all ages need to have clear goals. We should hardly expect the child who is just beginning his experiences with reading to have a mature concept of reading as a "process of getting and reacting to meanings." It is most unfortunate that many children struggle to read without knowing what reading is or with the vague notion that it is a matter of looking at print and saying words. How can beginners be led to see that we read to find out? Obviously, this can be accomplished by first having a need to find out what the printed matter "says." This is a goal which the child should seek daily through his reading experiences; it will certainly lead him on toward later, more complex goals for reading and a more mature concept of what reading is.

The conditions under which young children can participate in the selection of learning goals and in planning for attaining them should certainly include the utilization of challenging subject matter and much concrete material. The child world is truly "so full of a number of things" that fascinate and delight. Then why not use those lively and natural stimulants to learning activity? Why not capitalize on children's natural curiosity about airplanes and caterpillars and shadows and the rain and stones and trees and wood? Why not bring into the classroom as many objects as advisable and go out of the classroom to see and use and learn about others? Can young children understand that if a hen is to live at school until her eggs have hatched, she must be properly cared for? Can young children plan together and with the teacher what each child must do to provide proper care for Mrs. Hen? Of course they can.

Individual and Group Goals as the Basis of Curriculum Organization and Classroom Management

A clearly defined objective is, of course, the focus which guides both teacher and pupils in planning learning experiences so that the various phases of the whole activity fall into the proper relationship. The main purpose of a total learning experience gives the participants a basis for judging the relevance and the comparative values of the constituent experiences or activities. Goal direction must be operating in order to give a "unit of work" real unity. "What are we trying to do?" and "Is it worth doing?" should be ever recurring guides for planning and for evaluating progress.

Similarly, the old argument about the proper balance between too much and too little pupil freedom in the classroom goes back for its solution to goal-directed activity. The solution of this problem for each primary-grade classroom is to be found in the teacher's own answers to the following questions: What are we trying to do? What are we working toward? Is this freedom necessary to accomplish our goal? Is this freedom unnecessary to accomplish our goal?

Goals as set up by a group (including the teacher) are, of course, individual goals at the same time. If not, they are not truly the goals of the whole group. Furthermore, each child probably has a somewhat individual concept of the goal accepted by the group. The "same" goal is not really the "same" to individual learners even when stated in the same language. As competent psychologists and teachers are well agreed, the essence of motivation is to set up goals which will satisfy the fundamental needs of individuals and which are relevant to the interests of individual learners. It is encouraging to note a trend which is especially evident in our early elementary-school classrooms—a trend toward the choosing and pupil-teacher planning of work directed toward goals which are real to young children. More and more primary-grade children are finding opportunities in school to read in order to answer their own questions instead of just reading for the sake of reading; to write simple notes and letters that are really sent for real purposes instead of just writing for the sake of writing; to solve problems involving numbers because they really need the answers to their real problems instead of just computing for the sake of handing in a paper that checks with the answer key. Furthermore, such learning activities skilfully directed toward goals real to children should eventuate in new learner interests and goals, e.g., reading for fun, the challenge of expressing one's self well, interest in the number system itself.

THE SETTING FOR LEARNING

The actual setting for learning includes much more than what a casual visitor sees as he walks into a classroom. We may classify the effective factors in a learning situation as social, psychological, and experiential but must not forget that there is sure to be much overlapping from one category to another.

The Social Setting for Learning

The crucial position of the early school years in a child's development as a social being is incontrovertible. Teachers of beginning pupils are usually quite vocal about the difficulties encountered in preparing children for living together as a social group. They say, "I can't get started to teach these children anything else for the first month or six weeks. It takes them that long to adjust to the school situation." Such emphasis upon the social setting for learning "anything else" is well founded, but we might question the implication that getting adjusted to the school situation is at any time a finished matter. Nevertheless, the teacher does well to realize that a reasonable degree of social adjustment is a prerequisite for optimum achievement in learning such things as language and number.

For too long a time and by too many people (parents, teachers, and others) reading skill has been considered *the* primary objective of first-grade work. It is encouraging to note a definite trend away from that emphasis in favor of stress upon learning to live and work with other people. A simple construction activity, for example, may depend for its success upon social control and co-operation. For a group of first-grade children to learn to share and use a limited supply of tools successfully is a real educational achievement. Taking turns in using the one saw and three hammers, using the tools effectively, and showing consideration for the safety of others are significant learning achievements.

Since the social interactions in a classroom group may represent a learning process as well as a phase of the setting for other learnings, it is difficult to identify particular activities with either factor separately. In the practical situation, fortunately, they do not need to be separated. The teacher whose pupils are working together in the study of local weather does not need to be concerned with any such distinction. The children work co-operatively as a class and in smaller groups experimenting with thermometers, simple weather charts, and rainfall records and reading to find out what makes weather. As they work, no doubt much social learning goes on, and that same learning sets the stage for more effective present and future learning of something else.

Evidence concerning social facilitation of learning is being increasingly applied as teachers revise their ideas of "individualized instruction" from the notion of learning by each child in comparative isolation from his fellows to the idea and practice of differentiated instruction of individuals within small groups.

The Psychological Setting for Learning

The psychological context in which the learner finds himself may be largely dependent upon the social situation. Social facilitation of learning is certainly psychological. There still remains, however, the psychological setting represented by how the learner responds and feels and acts about social and other phases of the total situation.

Take, for example, the large number of children in the early school grades who cannot read because they think they cannot read, who cannot spell because they think they cannot spell, and who cannot handle number situations successfully because they think they cannot do arithmetic. They are as handicapped as if they actually did not possess the ability to learn these things. The teacher's task in such cases becomes one of helping the child "unlearn" the psychological block which bars him from progress. Where did he get the idea that he could not learn? Because he tried and "failed"? Because he was expected to do too much too soon? It is the teacher's business to find out what lies back of the learner's difficulty so that he can help the child into a better psychological climate for learning.

When a primary-grade child complains that his teacher "never smiles" or that he is a "cross patch," he is reporting an unsatisfactory psychological atmosphere for his school learning. When, on the other hand, he says, "We had fun building our supply store. I hope I get my turn soon to sell pencils and paper to the other kids," he is reporting a pleasant psychological setting in which he enjoys his learning activities and is "all set" to learn more.

In esthetic learnings (see chap. vii) the psychological setting is especially apparent. As children dance and skip to express their interpretation of the "skipping music" of a phonograph record, their faces as well as their movements can mirror sheer enjoyment. As one of them said, "I feel so free." The adult who never had the experience of "feeling so free" and who would "be caught dead" rather than try "such a stunt" should be glad, at least, that more and more young children are having the rich experience of feeling free to enjoy music and art and poetry and rhythms in whatever way seems natural to them. Psychological setting for learning? Yes, a very excellent type of psychological setting.

The teacher of children in the early years of their schooling has a most strategic position with regard to the subsequent attitudes of boys and girls toward school and all that goes with it. Whether a child of any age likes or hates school has much to do with his success in learning all along the line. True, occasionally a skilful teacher in the upper grades may succeed in undoing the negative attitudes a child has picked up earlier, but how much better it would be for all concerned if such undoing were not necessary! Primary-grade teachers will do well to remember that the attitudes toward school activities which are building every day in every boy and girl have much to do with the type of psychological context they carry with them in subsequent learning tasks.

The Experiential Setting for Learning

Though the experiential background which the learner carries with him will be dealt with more fully in connection with the developmental nature of learning, it should be pointed out here that the past and present experiences of children are an inescapable part of any learning situation. The child whose parents use good manners at home should, in general, have less difficulty learning good manners at school than the child whose parents have never displayed such behavior in either intent or practice. The different experiences which lie back of each child make the learning situations quite different for each. Or, as was pointed out in chapter iv, meaningfulness is relative to a person's experience.

The big question for the teacher is: If a child does not have the requisite background of experience, what can I do? And the answer is: Supply now, in so far as possible, the missing experiences or substitutes for them.[2]

Many of the background experiences which young children need are experiences with things, with concrete objects. The younger a child is, the more concrete experience he needs in preparation for learning concepts and solving problems. The primary-grade classroom should, therefore, be especially well supplied with materials and equipment which will make words and ideas real to children. Talking about tadpoles is not the same as seeing them. Hearing about feet and yards is not the same as seeing a foot ruler and a yardstick and using them to measure the length of the room. Reading about a fictitious "problem" in the arithmetic book is not the same as having actual objects and proving one's solution of a real number problem.

Modern schools, in general, do more than formerly to provide an adequate material context for learning, including libraries, excursions, science equipment, and other audio-visual aids to learning. In a few situations, remarkably rich and concrete settings for learning are often supplied. Even then, possession of materials is not enough; using the material context properly is the next step. The teacher needs to watch carefully that these many experiences with materials in the environment stay close to the point, that is, the goal of the learning activity. Particularly with young children do we need to guard against using *things* (e.g., films, just because they are available) before children can profit from them. We need constantly to ask: Will it really add to the material setting for learning? Will the learning situation be better for its use?

The social implications of object-motor activities are pointed out in the discussion of motor learning (chap. iii). Taking this relationship into account, we realize that the material setting for learning can dovetail very nicely with the social and psychological environment. For example, the use of tools involves co-operation and consideration of the rights of others; or, success in the manipulation of concrete objects changes a child's attitude toward the related subject.

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[2] See the discussion of "Fundamental Conditions for Fruitful Learning Experiences" in chap. xi of this yearbook.

DEVELOPMENTAL CHARACTER OF LEARNING IN THE EARLY SCHOOL GRADES

Proper sequence of learning experiences is both a matter of inner maturation and of experience, whether we consider an individual child or children in general. Section II of this yearbook includes numerous evidences of support for a "new order" in the planning of worth-while educational experiences for children, i.e., a shift from the imposition of an order based on adult logic to an order more consistent with natural child development. In stressing the developmental aspect of learning, it is neither necessary nor desirable to propose that teachers depend upon a set of fixed psychological stages or a single developmental pattern. At our present stage of inquiry into the mysteries of child development, the teacher will do well to interpret the "developmental character of learning" simply in terms of a careful consideration of the needs of learners, individually and collectively.

While the school beginner of five or six years of age is apt to be at one of the major milestones so far as stages of growth are concerned, his teacher needs to remember (*a*) that in spite of all available evidence concerning the "typical developmental level" of school beginners, no such description can represent the stage reached by each and every individual beginner, (*b*) that the major landmarks of growth and development are reached by a long, slow, step-by-step process of inner changes and accompanying experiences, which cannot be forced or reached in any other way, and (*c*) that each child needs to be firmly grounded at one stage before that stage can serve as the proper base for starting his climb to the next.

Appropriate developmental sequence from immature to relatively mature performance can perhaps be best demonstrated by a few illustrations concerning different types of school learnings in the early school grades.

Developmental Sequence in Learning Motor Skills

Appropriate timing for a child's beginning experiences in writing is closely dependent upon his needs for writing.[3] His need to write may arise from seeing other people write and wanting to do the same, or from needing to label his belongings, or from having something to say that he feels ought to go with a picture he has drawn. In any case, the need should be closely interrelated with the concept of what handwriting is: what writing looks like, how other people act when they write, the general direction of writing movements, and the notion that when it is finished it will say something.

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[3] Of course, the kind of "writing" that children often do in imitation of the hieroglyphics (to them) of adult writing, but which is largely making marks—any kind of marks—on paper, comes very early and represents a step toward "real writing."

Given a need for writing and suitable demonstration of the act, the child's next step is to try it (cf. chap. iii). Depending upon their levels of maturation and previous experience with writing equipment, individual beginners will give quite different performances. One will seemingly "write" with his whole body, while another will move only his fingers, arms, shoulders, and head. Some first-graders, of course, will really not be beginners in handwriting and will demonstrate more differentiated bodily movement patterns learned before entering school. The successful primary-grade teacher has long since learned the "patience" watchword and will recognize children's individual levels of development by observing each child's performance, accepting this performance as symptomatic of his present status, and guiding his subsequent learning accordingly. He will not reprimand Carl who "writes all over" and insist that he "sit still" and just move his arm and fingers "the way Susie does." Since "writing all over" is hard work, one would naturally expect less handwriting from Carl than from Susie. With appropriate encouragement at each sign of progress Carl will understand that he is learning to write even if, after months of practice, he does still write with tongue movements synchronized to hand and finger movements.

Some temptations to be avoided in teaching handwriting to beginners are: too much insistence upon neatness beyond their power to produce; too much insistence on "near-perfect" products; too long practice periods for young bodies which must struggle mightily for finely co-ordinated performance; too much talk about fine points before the child can see the distinctions; and too much writing, for the sake of writing, divorced from a need to write. Pushing a child beyond his developmental level achieves no good end and is apt to teach him, instead of handwriting, a feeling of inadequacy, frustration, or rebellion.

Developmental Sequence in Aesthetic Learnings

The developmental character of learning in the area of aesthetics is a central feature of chapter vii of this yearbook. The research evidence cited there to the effect that children do "manifest distinctive aesthetic responsiveness" should be most encouraging to all those who work with children in early elementary grades. Shrewd and sympathetic observers of children can confirm the truth of the statement by their own observation. Little or no defense remains for those who say that the five-to-eight-year-olds are too young to "really appreciate" or "really do anything with" art and music and poetry. Children, like adults, can most certainly appreciate aesthetic experiences *at their level.*

In this learning area, as in ideational learning, adults are prone to evaluate the child's performance in the light of mature finished products rather than considering it as a step in an on-going learning process. Because this is true, too many children have had too many frustrating experiences as they have tried vainly to reproduce a pattern, whether the pattern be a drawing, a song, or a "dramatic" reading. Too many teachers and the children themselves have concluded too soon that the learners have no talent for such things, all because they didn't arrive at a pattern destination immediately after starting their journey toward it. How successfully the child's early aesthetic responses continue into later years depends upon how well his aesthetic experiences are guided.

Individual children in any class will display differing levels of aesthetic maturity, partly because of differing natural abilities and partly because of differing experiences in the area. Modern primary-grade teachers are rapidly getting away from the pattern mold in the teaching of art. As they allow children to show what they *can* do in their own way, not only are the teachers impressed with children's differing abilities but the children themselves have a chance to experience real satisfaction and a feeling of success, each at his own level of artistic maturity.

Just as children need to see handwriting and try to write for themselves in order to get a start in learning to write, just as any learner needs to hear a language before starting to speak it, so do children need to experience art and music and other phases of aesthetics before they are expected to show what they can do with them. This experiential requirement applies in at least three ways in guiding aesthetic learnings. First, in judging a child's present performance one must consider the richness or poverty of his past aesthetic experiences. Second, when his past aesthetic experiences are found to be limited, he must be provided with others which will bridge the gap. Third, the teacher must realize the significance of each present experience as background for later performance and appreciation.

It is not essential—or, indeed, possible—for the teacher to isolate children's aesthetic responses from other types of behavior. An aesthetic experience may at the same time be ideational, emotional, social, or motor, since the evocative characteristic of an aesthetic response may be linked with any of these other phases of experience. The teacher does better to realize the relationship than to seek unfruitful demarcations. If one realizes that aesthetic development is a natural part of the total development of the much maligned but ever-present "whole child," it becomes apparent that the school must provide enough aesthetic experience to round out that phase of each child's experiences as well as an aesthetic schoolroom environment in which that phase of development can flourish. In such a situation, the teacher will never need to say, "This child can't seem to *learn* anything. Maybe he'd do all right in *art*."

We need to take the child where he is aesthetically and lead him gradually to such levels of aesthetic performance and appreciation as he is able to attain. One of the most serious blunders in guiding the aesthetic learnings of children in the elementary school is the too-prevalent stress upon performance at the expense of appreciation. Technique in any of the arts is obviously an essential element, especially at mature levels of development; but technique forced on a child too soon can only result in unnecessary failure in performance and, sadder still, in the building of barriers to the appreciations the learner might so easily have experienced at his natural level of maturity. Why spoil a first-grader's pride in the picture he thoroughly enjoyed drawing by reminding him that his lines are wobbly? Why make choral reading by second-graders a burden instead of fun by insisting that everybody use the teacher's model of inflection and accent? Why kill the third-graders' natural joy in singing a lilting melody by insisting on mechanical reading of the musical score? Why, indeed? Improved as elementary schools now are in allowing freedom for children's spontaneous, natural expression, much room for improvement remains if the next generation of adults is to be more truly "adult" aesthetically. Making the child afraid to try an original painting by insisting that it be as good as the pattern or ridiculing a naive childish comment in the interpretation of a poem are not only crushing blows to the child's personality but also stone-wall barriers to further aeshetic expression and development. Aesthetic production, reproduction, and enjoyment demand freedom of response. We must help children keep the free spontaneity of early childhood if their aesthetic experiences are to be stepping stones to further growth.

Developmental Sequence in Language Learnings

The necessity for observing a natural developmental sequence of learning experiences is readily demonstrated in the learning of language. Research and practice in that area, especially in regard to reading, have gone far toward facilitating children's learning of language processes in the early school grades.

Language, as considered in the subsequent discussion, is a vehicle for communication.[4] Workers in today's elementary schools have quite generally accepted the classification of the language arts as consisting of listening, speaking, reading, and writing experiences. There is, currently, much emphasis upon the idea that the language arts are processes rather than subjects of the school curriculum. This emphasis upon process has been wholesome, directing teachers' attention toward communication of ideas. Without lessening that emphasis, they need also to consider the varying subject matters within which or upon which the processes operate. That is, listening, speaking, reading, and writing must be about something. It is a contradiction of the essence of communication to assume that they may be employed to communicate nothing. They must communicate something—ideas, thoughts, opinions, generalizations; history, geography, arithmetic, literature. The subject matter or content transmitted through the language processes affords the key to integration of learning in the language-arts field with learning in all other areas. If the language processes are to have meaning, they must carry content; they must "say something," the word "say" representing process, the word "something" representing content, and each being indispensable to the other.

What does this discussion of language have to do with a developmental sequence for learning? Simply this: Effective learning of language must proceed in relation to each learner's present development as regards both process and content, a development which has been brought about by influences in the home, community, and school. For example, the child's progress in listening depends, among other factors, upon his present abilities in hearing, attending, and reacting and also upon his past and present experiences with the subject matter being discussed. His progress in speaking depends upon his present abilities in hearing, pronouncing, and enunciating and also upon his past and present experiences with the subject matter of his speech.

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[4] Language may also be considered as a vehicle for thinking and for control of behavior. The present discussion deals only with the communication phase of language use.

His progress in reading depends upon his present abilities in differentiating visual symbols, differentiating auditory symbols, and associating visual and auditory symbols and also upon his experiences with the content conveyed by the symbols. His progress in writing depends upon his present abilities in handwriting and spelling and upon his experiential background of "something to say." If language is to be a process of meaningful communication, it must be based upon previous learnings of both process and content.

Teachers of children in the early grades of the school will do well to review occasionally the common experiential sequence of children's language activities, much of which takes place before the children come to school and all of which enters into their present and future learning. The infant's first use of a verbal language—in our country, English—is in hearing and interpreting the meanings of words spoken by someone else, i.e., listening. This must happen *before* he can learn to use those words with meaning in his own talking. When he learns to talk (speak words and sentences to convey meaning), he obviously does not stop his listening experiences; the two proceed together. Language continues to consist of only its two oral phases, listening and speaking, until the child enters upon the reading phase some years later. Entering upon the reading phase depends upon much intervening experience. It is a big step from the use of oral language to the use of written language. The sum total of all his previous language experiences as "receiver" and "sender" in the process of communicating meanings now forms a base for the step to reading, the receiving phase of written language. Once having attained some sense of competence and security in his ability to get meaning from written language, i.e., in reading, the child can quite naturally go on to a still more difficult phase, written expression.

If the language arts consisted of mere superficial recognition and manipulation of abstract language symbols, the order of their introduction and the periods of assimilation between successive phases would matter much less than they do when the words and sentences must carry meaning. The child who enters school with limited control of oral language and a comparatively barren background of experience with things and people cannot possibly manage a quick step upward into the meaningful interpretation of written language. Perhaps he can learn to call words, but he cannot really read until he recognizes and reacts to the meanings of those words as he recognizes their written forms.

A larger proportion of primary-grade teachers than formerly are paying more attention to the oral-language backgrounds of their pupils as clues to what next steps each learner can reasonably take in learning to read or in preparing for learning to read. A smaller proportion perhaps have realized and acted upon the corresponding relationship between reading and the next step, writing. If by "writing" we mean saying something in written language, far too many children in the early school grades have been introduced much too soon to a complex language activity. A certain "slow learner" was not as slow as many teachers are in seeing this point. An adult who observed his pitiful attempts at writing said, "Bill, I don't see how you can read your own writing. Can you?" Bill replied, "Shucks, no! I can't even read reading!" We have too many Bills in first-, second-, and third-grade classrooms who are being pushed into attempts at written expression before they become established in the preliminary language activities of listening, speaking, and reading. Teachers in all the early grades will do well to appraise the written language assignments in terms of their pupils' present language development.

Two concepts concerning learning which apply in any series of learning activities are especially demonstrable in connection with reading because of the large amount of study and research these ideas have occasioned in the reading field. They are the concepts of *readiness* and of *pacing*. Both have been implied in the preceding discussion, but a few reminders concerning each may still be in order.

Extensive discussion of reading readiness has continued now for many years, the basic idea being that there is no point in trying to teach children to read before they are ready. With this, as with other ideas in education, practice lags far behind theory, but there has been much progress. Both in theory and in practice, clarification and extension of the concept should be continued.

Reading-readiness factors are usually classified as physical, mental, emotional, and social. The physical and mental factors have been most thoroughly investigated and subjected to measurement. The emotional and social factors, because less amenable to measurement, are apt to be neglected. This is unfortunate since they are so closely interactive with the learner's personality development. The child who fails in learning to read because he is not emotionally ready and the child who, because of failure in too early attempts at reading, becomes emotionally unready for subsequent attempts are equally unfortunate. Both of them are in unfavorable positions as regards future progress in both reading and personality development. Exactly at this point does the unnatural and pointless dichotomy between teaching children and teaching subject matter become apparent. The teacher is trying to teach a *child to read*. What happens to the child emotionally cannot but affect his success or lack of success in learning to read. His success or lack of success in learning to read cannot but affect the child himself emotionally and otherwise. The voluminous literature on the teaching of reading is full of case studies and other research on this point. What teachers need to do is to study pupils carefully and treat them accordingly, bearing in mind that proper and natural developmental sequence for learning will bear fruit not only in regard to school learnings but also in regard to personality.

It is perhaps not an exaggeration to say that most elementary-school teachers minimize the complexity of reading readiness. It is so easy to think of it as a score on a test or a point on a scale when it is, of course, no such thing. It is so easy to say a child is ready or not ready for beginning reading from books, but the fact of the matter is that not only are no two children alike as to reading readiness but also that no one child is equally ready in respect to different phases of his own physical, mental, social, emotional, and experiential background for being introduced to a new and complicated language experience.

A neglected aspect of the complex called reading readiness is the child's feeling of a need to learn. Just as writing can be most successfully introduced when the child has something he needs to say in writing, so also with reading. When the child indicates by his own statement or other behavior that he is curious about "what the book says," or that he wants to read because he has "something to find out" by reading, he has furnished the alert teacher with one of the best clues to reading readiness. Wanting to read—or better still, needing to read—is a fundamental requisite in readiness which does not show on reading readiness tests, useful as such instruments are in other ways.

Prevention of unnecessary difficulties and barriers to learning is, of course, the why and wherefore of attention to reading readiness or any other kind of learning readiness. It is most encouraging to note the recent trend in professional literature away from major stress upon "remedial" reading in favor of stress upon prevention of those unfortunate child experiences which make remedial instruction necessary. Remedial-reading help must continue and be augmented at all school levels for those children who need it; but there should be less and less need for such work as teachers learn to fit reading tasks at all times to the children's ability levels. In fact, the necessity for remedial instruction is a sign that the proper developmental sequence for the child's learning has been violated in one way or another.

The preceding discussion of reading readiness has emphasized readiness for beginning reading, but the basic principles of appraising readiness for the first step apply as well before any and all of the succeeding steps. With the extension of readiness, we come to the more general concept of "pacing." If the long-term learning process (in reading or any other type of activity) were represented as a stairway of successive developmental steps toward mature performance, we could say that the learning is properly "paced" when each successive learning step is low enough so the learner can take it successfully but high enough to represent progress toward a goal. Every adult who has helped a very young child walk up a stairway knows that either the adult's progress must be slowed down or the child hurried beyond his natural rate. Some adults in that situation will grasp the child's hand firmly but take each step only as fast as the child can do so. Others will try to hurry on, always a step ahead, pulling or dragging the child along. Still others, impatient of the delay, will hit upon the "easy" solution of picking the child up and carrying him to the top of the stairs.

Using this simple illustration, we may draw an analogy which should be especially useful to teachers of children in the early elementary-school grades. Children of six, seven, or eight years of age may be able to negotiate ordinary stairways better than the younger child in the illustration, but their "reading legs" may be correspondingly short and unused to climbing. Some teachers in guiding a child's progress up the reading stairway will sympathetically adjust their teaching to the child's ability to "keep up"; that is, they will allow more time on each step. Other teachers will hurry on, dragging the child by main force to a more difficult level. ("We have this book to cover, you know.") The learner, feeling breathless and inadequate to the pace set, gets tired and discouraged. ("Why do we have to do this old reading, anyway?") Still other teachers would like to "carry" the child up the reading stairway, but there the analogy breaks down. They can't. If the child is really to mount the stairway of learning and reading, *he* must *learn* and *he* must *read*. He must go up the stairs "on his own power," even though guided. Teachers who boast of how many "first readers" or "second readers" or "third readers" their charges have "covered" had better pause to ask whether *they* or the *children* really "read" those books, really climbed those stairs.

Useful as it is, the stairway analogy is weak in another respect. It represents the same stairway for all, only variations of rate being possible. Actually, the best pacing of learning can only be achieved if the teacher realizes that there is no standard stairway for all learners; the height of each "next step" must be suited to the length and strength of each particular child's learning "legs."

Many a first-grade teacher has said, "That's all very fine. I believe in taking each child where he is and not pushing him any faster than he can go, but what will the second-grade teacher say if he has not read the first-grade basic readers?" Perhaps about as many second-grade teachers have made the same remark about third-grade teachers, third-grade teachers about fourth-grade teachers, and so on up the line. Some of those who make such remarks may be resorting to an alibi for not applying what they know about developmental sequence in learning. Most of them may well be sincere, however, in their concern about what the next teacher will say or think of their teaching if their pupils don't "cover the material" specified for the grade. They all need to pause to reconsider what they are saying and what the implications of such remarks may be.

Suppose the second-grade teacher decides to put Johnnie through the second-grade readers. Having "gone through" the second-grade basic readers does not automatically endow Johnnie with third-grade reading ability. His lack of readiness for reading books of typical third-grade difficulty will soon become apparent to the third-grade teacher. So, the second-grade teacher has not been protected against criticism by pushing Johnnie through the second-grade readers. Besides that, Johnnie's personality, his attitude toward school, and his opinion of his own abilities may all have suffered in the process.

Now suppose the second-grade teacher decides to ignore the real or imagined threat of criticism from another teacher and, instead, attempts to pace Johnnie's reading experiences so as to fit his present complex of abilities, attitudes, and performance. Suppose he reads interesting books of easy first-grade difficulty until he feels secure in the self-demonstrated fact that *he can read*. Suppose he goes on from there to harder first-grade books and, later, to easy second-grade books. Suppose he makes real progress but does not get "through" all the recommended second-grade readers. The criticism of the next teacher may or may not be as severe as anticipated. Johnnie is still ahead of where he would have been had his second-grade teacher pulled him up the reading stairway so fast that he could get no footing on one step before he was expected to stand on the next. He has at least progressed at a rate commensurate with his power to progress. He knows that *he can read.* Maybe he can't read as difficult books as some of his classmates, but he *can* read easier ones and he enjoys doing so. Such knowledge for Johnnie concerning himself is profoundly more valuable than having "gone through" any amount of too difficult material with the inevitable accompanying frustrations and absence of learning.

The fallacy of the rigid grade-level concept is apparent to anyone who has any knowledge concerning individual differences among the children to be found in any particular grade. It is especially important that primary-grade teachers divest their minds and practices of its connotations. A good start in school is an individual matter. Results of instruction cannot possibly be improved by trying to make children do what they are not ready to do at any specified point in their schooling.

To properly pace the learning experiences of individual children, the teacher must consider the effect of: differing individual points of departure; differing rates of learning; differing methods of instruction (e.g., the relative concreteness); and differing end-results desired. In regard to the end-results, teachers of experience have ample opportunity to see their own and pupils' goals change as development proceeds, as when the child who thought he couldn't read discovers that he can and immediately wants to learn to read still better.

The particular illustrations used in the preceding discussion have stressed sequences and steps in the child's learning. These steps should not be considered as isolated or sharply separated one from another. Actually, the steps in the child's learning are successive reorganizations of a total performance which gradually bring the learner to an increasingly refined, exact, and simple organization of his experience.

Evaluation of the Learner's Progress

Progress or achievement of any kind can be evaluated only after clarification of the criteria in terms of which evaluation is to proceed. Several implications for evaluating pupil progress in learning have necessarily been touched upon in the preceding discussion of the learning process itself. Some of the most significant are summarized here by way of emphasis.

The Terms of Evaluation

Learning can be properly appraised only in terms of learning goals, those held by the learner and those held by the teacher. Neither the child nor the teacher can see progress except in relation to what is being attempted. Obviously, the pupil must participate in the evaluation of his work because he knows better than anyone else what he is trying to do. Equally obvious is the need for teacher participation in evaluation. As the teacher discusses children's work with them, the young learners can profit from the kind of guidance which will remind them of what they started out to do and which will help them to reshape their goals for subsequent learning. Helping children to judge their progress in terms of worth-while goals is the best possible reminder to the teacher to check on the relative significance of the goals held by the pupils and those the teacher is emphasizing.

Next, evaluation of learning can proceed properly only in terms of the learners' aims and their individual and group characteristics. This requirement can be met only to the extent that the teacher knows the pupils and they know themselves. The whole problem of levels of aspiration enters here. The primary-grade teacher has so much to do with the early development of desirable levels of aspiration that helping these very young children evaluate their work according to individually suitable standards should be recognized as one of the essential functions of teaching at this level. The expectation that all third-graders must earn standardized test scores at third-grade national norms must be abandoned. Further, evaluation should be done in terms of the learning situation, including the psychological, social, experiential, and material factors which are operating.

Finally, evaluation should proceed in terms of what is known about developmental sequence of learning tasks. That is one of the reasons that evaluation must be continuous. The children and the teacher must know where they were yesterday in order to plan well what to do today and must observe where they are today in order to proceed to best next steps for tomorrow.

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CHAPTER XI

IMPLICATIONS FOR IMPROVING INSTRUCTION IN THE UPPER ELEMENTARY GRADES

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Working Principles for Improving Instruction

Previous chapters of this volume have presented in detail findings in the field of learning and related areas. This research, together with the implications which the findings have for practice, must form the basis for any significant reform in teaching method and other school practices. We are long past the time in the history of educational method when rule of thumb and uncontrolled speculation are adequate for improving the educative process. Fundamental advances in the quality of instruction at any level of the school system will depend on the careful translation of the rather abstract principles, which have emerged from research, into specific working ideas for method which may be tested empirically.

For this reason, the first part of this chapter is devoted to stating certain working principles for improving instruction. The main purpose is to enumerate those principles which have immediate and important significance for method and to show how specific teaching techniques derive from them. It is believed that the techniques which are discussed throughout this chapter follow logically from these principles and that the principles themselves are implied by the findings of research.

Principles of Method for the Upper Elementary Grades

The working principles which are discussed in the first part of this chapter are offered as a foundation for the improvement of instruction at the upper elementary level. These principles involve not only what is ordinarily called "teaching method" but also such things as organization of the learning group for instruction, the function of subject matter in learning experience, the problem of continuity in learning experience, and motivation. All these factors are intimately involved in instructional problems, and all of them are significant aspects of method.

It may be said by way of a preliminary generalization that perhaps the greatest need at all levels of formal education at the present time is the need to arrange learning experiences so that learnings gained in school are *effective* in general experience; so that these learnings *make a difference* in the lives of the children. What follows in this chapter is based on the assumption that, regardless of what pattern of instruction is to be followed, what sequence of studies is to be organized, and what curriculum materials are to be used, the ultimate test of school instruction is the degree of effectiveness with which people can use, in the course of experience at large, the things which they have learned in school. It is believed that the formulation of any proposals for the improvement of instruction must involve appropriate consideration of this principle.

The question is often asked, are there problems of instruction which are peculiar to the upper elementary grades? The answer seems to be that, in one sense, there are such unique problems but, in another sense, the *general pattern* of experience provided for upper elementary children should be similar to the pattern of the primary grades. As children mature and learn, they develop resources which they did not have in the primary-school years. Because of increasing mental maturity and experience, they are better able to handle more difficult conceptual material and to deal with abstractions. Their intellectual horizons are extended, and they usually have achieved sufficient mastery of the skills of communication and number to be able to use these skills efficiently in further learning. If children in the upper elementary grades have experienced a rich and well-organized program in the primary grades, their interests have been increased many-fold, and their curiosity about the natural world and society has been stimulated. These factors, among others, make it possible for teachers of the upper elementary school to plan educative experiences which have more abstract elements, which involve the use of a greater variety of the materials of learning—more printed matter, for example—and which give the pupil more responsibility for his own learning.

On the other hand, it is well known that instruction in many, if not most, elementary schools tends to become abstract and academic too fast. Schools which provide reasonably suitable programs in the kindergarten and early primary grades often insist that learning in the later elementary years be restricted more and more to the perusal of printed matter and to other vicarious experiences. Direct experience tends to diminish in quantity and, although individual differences are at least as prevalent in the upper elementary school as in the lower, they usually tend to be ignored more often at the upper level.

The point of view of this writer is that the pattern of experience, as described in chapter x of this yearbook, should be extended into the upper elementary grades and that the principles of instruction which are advocated there are as applicable to older elementary children as to younger children. There is no reason to suppose that an upper-elementary teacher need know less about child growth and development, that he need to be less concerned with goal direction, or that he can ignore the experiential basis of learning with more impunity than can the primary teacher.

It may be said, then, if there are problems of instruction which are unique to the upper elementary grades, it is because of the increase in the resources of pupils to meet increasingly complex problems. The basic pattern of learning is the same, and the fundamental principles of method are similar, if not identical.

IMPLICATIONS FOR IMPROVING INSTRUCTION

Fundamental Conditions for Fruitful Learning Experiences

The fundamental business of the school at any level is to arrange matters so that children experience certain situations which are potentially educative and which children would not be likely to have unless they were deliberately provided by some agency or institution. The phrase, "learning through experience," has been used for many years in educational discourse. Very often its use has been lacking in precision and meaning and has served to do very little but becloud certain important issues. Classroom teachers, in fact, often suspect that it is only another of the catch-phrases which are peculiar to educational thought and that it does not have very much to do with teaching and learning in the day-by-day life of the school. Actually, an understanding of the experiential process and its relation to learning is essential to all who work directly with children in the educative process.

Previous chapters have shown that experience is a process of interaction of a living thing with the environment in which it finds itself. A child comes in contact with the various objects and forces in the environment. He uses these objects and energies in various ways to achieve his purposes. He effects changes in the pattern of relations among the things and energies, and he modifies his own behavior and thus learns new responses. This process of interacting is the basis of all learning we know anything about in the natural world. All major contemporary schools of experimental psychology have as a fundamental hypothesis the principle of learning through interaction of organism and environment.[1]

This description is highly schematic, but it has important implications for the improvement of the teaching process. It reveals, for example, that what we commonly call teaching is really a process of placing children in an environment which has been deliberately planned to elicit and fix certain responses which those in charge feel children ought to have. The interaction hypothesis also indicates that both the quantity and the quality of learning is heavily determined by the kind of environment which is provided. This sounds very much like a tautology, but elementary schools are often found which protest loudly their faith in democratic principles and yet provide an environment for children which gives little or no opportunity for a child to experience democratic life as it is commonly understood. Similarly, schools are found which claim to lay great store by scholarship and the formation of scholarly habits. Yet these schools often provide few or none of the facilities and materials which are essential to scholarship and carry on "instruction" in such way that scholarship, in any intelligible sense of the word, is discouraged rather than fostered.

The interaction hypothesis also indicates another important principle of instruction. It has long been known that any learning situation is highly complex. A child learns many things simultaneously. He learns not only spelling or arithmetic, he also learns certain attitudes toward spelling, toward other members of the group, toward the teacher, toward school life, and so on. These attitudes, which very often are ignored by the teacher in setting up the school environment, may persist for long periods of time and be very powerful in their effect on subsequent behavior. They may, in fact, persist long after the specific learnings, for which the teacher so carefully planned, have been forgotten.

Previous chapters have indicated that human learning is social in nature. The child interacts with the natural environment, but the way in which he learns to interpret and deal with the natural environment depends on what he learns from the society in which he lives. His whole conception of the natural world and of society, together with its complex relations, its approved ways of action, its instruments and skills, he learns in a social context. Even those learnings which we ordinarily call "intellectual" and which we tend to differentiate from "social" learnings, presumably because the former have to do with knowing and the latter with acting, are social in nature. We teach children such things as the skills of communication and number precisely because they are instruments of social intercourse which are necessary for an individual to have if he is to adjust to the life of his times.

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[1] Cf. statements by writers whose theoretical positions are quite different: Clark Hull, "Conditioning: Outline of a Systematic Theory of Learning," *The Psychology of Learning*, p. 62 (Forty-first Yearbook of the National Society for the Study of Education, Part II. Chicago: University of Chicago Press, 1942), and George Hartmann, *Educational Psychology*, p. 160 (New York: Macmillan Co., 1941).

It may be said further that any division of learning activity in school into "intellectual," on the one hand, and "social," on the other, constitutes a false dichotomy; one, indeed, which has for years stood in the way of the improvement of instruction. The information and skills which are ordinarily taught in the upper elementary years are social learnings. They are expected to function in later years in a social setting. There is every reason to suppose that, whatever else one can deduce for school practice from findings in the transfer of training, one thing seems likely: If we expect school learnings to function effectively in a cultural context after they have been learned, they should be gained in a cultural context in the first place. The learner should be aware of their relation to things and events which he will encounter later in different and novel surroundings. Although no school can duplicate exactly the conditions under which learnings will function in subsequent experience, it is extremely important that school learning be organized in such way that learnings are potentially functional.

Providing a Suitable Educational Environment

Learning experience has been defined as the process of interaction of the learner with an environment. To any environment, whether in the school or without, the learner brings not only a store of learning acquired previous to his school years but also certain inherited traits and attributes. The kind of experience the learner will have depends on this previous learning, on his native stock of abilities, and on the kind of environment which the school provides for him. If that environment is narrowly restrictive in its influence on him, if the range of potential learning experience is narrow and formal, if the materials with which he is to work are few in number and poor in quality, the kind of learning he will gain will be meager and restricted. If, on the other hand, the school is able to provide a rich environment with many and varied materials, with facilities which may be adapted to many kinds of experience, and with ample opportunity to engage in a wide range of activities, the learning experience of the child will be richer, more varied, and more satisfying. Teachers have no control over the heredity of the children with whom they work or over the abilities and attitudes developed elsewhere. Whatever inherited traits and abilities they bring with them to the elementary school the teacher must accept. They are the raw material with which he must do his work. The process of teaching is a process of nurturing the native attributes of the child through the provision of the proper kind of environment; it has nothing to do with changing or altering native capacity.

Schools have not ordinarily appreciated their most potent control over the educative process. Environments provided in schools, far from having been set up in terms of those who are to do the learning, have often been highly standardized in character. The physical environment has been so rigid and inflexible that the number and kind of learning experiences which it was possible for the teacher to provide have been severely limited. Therefore, learning activities in the upper elementary school have been, and in many places still are, confined to sitting and reading and listening. The amount and kind of interaction has been deliberately reduced, and consequently the opportunity for learning has been reduced. Schools have placed two kinds of restrictions on opportunity for learning. By providing a physical environment which is so inflexible that only a very limited type of activity is possible, the school has reduced the potential number of learning experiences. It has further reduced opportunity for learning by setting up a social environment in which the individual is often hedged about by a great number of unnecessary restrictions on his activity, by taboos of various kinds, and by other repressive measures. For these reasons, the kind of learning done in schools has often tended to be limited in scope and meager in significance.

In view of what is known about the relation of the environment to learning, there seems little doubt that improvement of instruction in the upper elementary grades depends to great degree on providing environmental conditions which are far more conducive to learning than many now are. It would seem that the minimum essentials of a good school environment would include a physical setting which is flexible in nature and is capable of being used for a variety of purposes. The old-fashioned classroom with the desks all firmly anchored to the floor gave teacher and children little opportunity to do anything except carry on the traditional school activities of sitting, reading, and listening. Many teachers who are still teaching under such physical limitations have shown enormous ingenuity in altering the environment so that it might be used for other kinds of activities. It must be recognized, however, that although something can usually be done with even the most antiquated elementary-school plant and that absence of expensive equipment is no excuse for a rigid, formal program, the greatest improvement in instruction can come only when teachers and children are freed from unnecessary restrictions on learning by outmoded and ill-designed school plants.

There is also a great need for organizing the social environment of the school in such way that the classroom more nearly resembles a laboratory for learning and inquiry than many do at the present time. For example, if scholarship is to be nurtured, and if it is to be prized by children, the kind of environment which is conducive to scholarly activity must be provided. Scholarship at any level demands library facilities and library service as well as an instructional program which is built about the library. There is need for supplies and equipment which make inquiry in the natural sciences possible, just as there is need for materials adapted to a wide range of activities in the fine and applied arts. A good program in the elementary grades demands a place for group conferences and discussion as well as a place for quiet individual study. At another point in this chapter, the problems of providing suitable curriculum materials will be discussed at greater length.

Improvement of instruction waits in many places on the provision of a better physical environment. It should be pointed out, however, that the mere furnishing of more and more facilities and materials to teachers will not automatically result in improved instruction. Improvement of the physical environment is a necessary condition for the improvement of instruction, but it is not in itself a sufficient condition. Other factors must be present before significant progress can be made.

Providing for Reflective Thinking, Planning, and Evaluation

Previous chapters in this volume, as well as material in many other sources, have shown clearly that the best kind of learning goes on when there is great opportunity for children to engage in reflective thought and problem-solving. One of the chief objectives of the teacher of the upper elementary grades should be to provide numerous opportunities for learning activity of this type. It may be said that the most fruitful kind of learning experience is one in which a person, or a group, evolves a plan for dealing with a meaningful situation, puts that plan into action, and then evaluates the outcome of the plan in terms of the original purpose.

While this pattern of learning is highly regarded in the literature on learning and method, it has never been used widely in schools. There are a number of reasons which account for this, and perhaps the strongest is that such procedure is simply not in consonance with our whole tradition in teaching method. While the theoretical aspects of problem-solving have been worked out in considerable detail, specific implications for teaching practices have not. Consequently, many teachers in the elementary school do little or nothing about reflective thought or problem-solving, even though they may insist that they recognize their value and importance. To base learning activities on reflective thought requires an actual reorientation of the teacher's conception of the role of content in the learning process as well as his conception of the role of reflective thought in experience. The common pattern which the school has set up for learning is "studying about." Children in elementary schools "study about" milk, the post-office, China, transportation, or similar topics. It is true that many teachers are skilled enough to develop these topics in such way that they have some appeal to the interests of children, but for the most part it is also true that the learning involved remains academic, in the bad sense of the word. Characteristically, our most common device for attempting to stimulate reflection and inquiry is the synthetic "problem" of the arithmetic book.

Research and theory seem to show one thing clearly. Reflective thought is called into play *only in the presence of problems which are of genuine concern to the learner.*[2] The failure of most schools to stimulate reflective thought very likely can be accounted for by their failure to organize instruction so that children encounter concrete problems with which they have great concern to deal. The whole pattern of instruction in the upper elementary school commonly has been pitched at "studying about," and children have rarely had the opportunity to engage in reflection and inquiry, which the presence of actual problematic situations stimulates.

A simple example may serve to illustrate what is meant. The study of plants is not infrequently a part of the curriculum of the upper elementary school. Children may be given books to read, and they may be shown pictures, film strips, or other materials of that kind which give information about plants. The teacher may actually bring plants into the schoolroom. In reporting practice in published units of work, teachers often make such statements as, "The children decided to find out everything they could about plants," or "The children made a list on the board of the things they wanted to know about plants. After they had listed these things, they used their books to find the answers." There are many worse teaching practices than this, and, as a matter of fact, this technique in the hands of a skilful teacher probably represents advanced practice at the present time. But it also is still a highly academic procedure, depending largely on vicarious experience and comparatively unrelated reading. It is at least doubtful whether in procedure of this kind there will be great opportunity for children to deal with concrete situations in the course of their study, and there is reasonable doubt that reflective thinking in its true sense will be stimulated to any significant degree.

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[2] For a discussion of problem-solving see *supra,* chap. viii. Another concise discussion will be found in L. J. Cronbach, "Meanings of Problems," *Arithmetic, 1948.* Compiled and edited by G. T. Buswell. Chicago: University of Chicago Press, 1948.

There is another possibility for arranging learning experiences with plants. Instead of having children "study about" plants, let them grow plants on an extensive scale. Let a school garden be planted in proper season, let plants be grown indoors, let new varieties be introduced and tried. It is inevitable that in the course of these activities a great many problems will appear. Diseases and pests will cause difficulty. Different varieties will fail to grow properly because of improper soil or moisture conditions. The number of opportunities for investigation and experiment will certainly be very great. The business of the teacher is to take advantage of these opportunities, to encourage an attitude of inquiry, to assist children in setting up experimental situations to test ideas, to make available a wealth of materials of all kinds—books, other printed material, films, and so on for reference and research purposes. It is submitted that practice of this kind promises better to provide for reflective thought, for planning, analysis, and evaluation than does the first procedure described. It promises better because it makes possible and encourages the meeting of concrete situations on the basis of thought and inquiry.

It is true that hundreds of plants could be grown in a schoolroom without any appreciable educational results occurring. Everything depends on how the teacher takes advantage of the opportunities as they arise, his ability to manipulate the environment, his sensitivity to the importance of reflective thought, and his skill in providing for it. John Dewey [3] warned three decades ago that: "Practical activities

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[3] John Dewey, *Democracy and Education,* p. 319. New York: Macmillan Co., 1916.

may be intellectually narrow and trivial; they *will* be, in so far as they are routine, carried on under the dictates of authority, and having in view *merely* some external result." His warning is as pertinent today as it ever was.

It is not maintained that all learnings suitable for the upper elementary child can or need be gained in this way. It is maintained that this is a highly valuable pattern of experience and should be given an important place in the elementary school. Direct participation in basic cultural activities, such as that described above, can give a secure background of firsthand experience by means of which children can understand and deal with more abstract and complicated problems.

Functional Acquisition of Knowledge and Skill and Its Relation to Meaning

It is difficult to believe that practice in the upper elementary school can be refined and improved without considerable attention being given to the question of how learning situations can be arranged so that the learner grasps securely the significance of what he learns. In the preceding section of this chapter a brief description of two possible approaches to the study of plants in an upper elementary grade was given. The second type of situation described could obviously furnish a great deal of opportunity for functional learning situations. In the sense the term is used here, functional learning is that learning which takes place within the course of some larger activity, although it should be recognized that there are other types of functional learning situations. Those who advocate extensive opportunity for functional learning feel that, in the course of meeting and dealing with situations which arise in the course of the various activities involved in growing plants, children would gain many new insights into the nature of plant life and would form and refine skills of many kinds. These learnings would in one sense be incidental, but they would be learnings, none the less, and there is reason to believe that they would have more significance for the learner than those acquired in a more formal and academic way. To generalize briefly, those who advocate a great deal of opportunity for functional learning in the elementary school do so because they believe there is evidence that meaningful learning is provided best when there is opportunity for functional development of knowledge and skill.

A boy in Grade IV builds a model boat as a part of a unit of study on transportation. When he has finished the boat and tries it out in a tub of water, he finds it will not float on an even keel. He is profoundly dissatisfied with what he has done and seeks to overcome the difficulty. At this point his teacher can do a number of things. The teacher can say, for example, "Put a heavier keel on your boat, shorten the mast, put the mast in the exact center and your boat will float upright." If the boy does these things, his boat will indeed float, but what will have been accomplished so far as the learning of the boy is concerned? One of the factors involved in this problem is what is commonly known as the principle of the moments of force on a lever. The boy does not understand the abstract principle as it is stated in books on physics, but he knows about see-saws, and he knows from firsthand experience that a heavy object can be pried up easily with a long pole. He does not know that the same principle is involved in the failure of his boat to float properly.

This is the point at which a teacher can help him apply previous learning to the solution of a novel situation. The boy can be guided to apply reflective thought to the problem, to evolve ideas for dealing with the problem, and to test his ideas experimentally. In the end his boat will float satisfactorily, but he will also have gained insight into an important principle in physics. His learning has been incidental so far as he is concerned, for *his* primary concern was to remedy the defect in his boat. However, an abstract principle has gained increased *meaning* for him, and he has one more resource at his disposal for meeting related situations which may arise in the future.

The psychology of meaning is complex, and much work remains to be done. However, there are at least three principles which will be of value to teachers and other school workers who are concerned about providing for more meaningful outcomes from the acquisition of knowledge and skill. First of all, meaning is a property or quality of behavior, where behavior includes intellectual and emotional as well as overt physical factors. It does not reside in things in the environment as one of their fundamental properties. A stone or a house is not true or false, meaningful or meaningless, in and of itself. The meaning is in the behavior of the individuals who are involved in some form of interaction with the house or stone. To give a new meaning to a child indicates that his behavior with respect to certain elements in the environment must be changed. It is not possible for him to be given a meaning in the way he can be given an apple or a haircut.

Second, meanings are the result of a genetic process. Their origin is in the process of interaction of organism and environment. Gradually, as similar experiences develop, the meaning of a particular thing or event becomes enlarged, extended, and deepened. Meanings are embodied in symbols and are thus related to conceptual thought and to language, but symbols themselves have meaning to a child only as his previous fund of experience is sufficient to enable him to connect the abstractions presented by the symbols to what he already understands. If he does not have sufficient background, his behavior with respect to the symbolic material will be insignificant and will fail to have any important educative quality. The importance of this concept for the problem of continuity in learning will be discussed at another place in this chapter.

Third, the ultimate test of meaning is functional use. The ability to use in a functional way things learned in previous experience remains the ultimate test of the significance those things have for the learner. In this connection it is important not to interpret "functional use" exclusively in the narrow, utilitarian sense of the term. Some things which are learned are of primary value for direct application to practical use. Others are most valuable because their acquisition makes it possible to understand and learn new things. In both cases the use is functional and indicates meaningful learning.

These propositions have implications for teaching in the elementary school which are of immediate and profound significance. These implications are so numerous that it is possible to discuss only a few in these pages. Perhaps the teaching of the common school skills will show the important issues. The skills of communication and number, which are universally taught in elementary schools, are functional in their use and value. It seems reasonable to suppose that since their value lies in their availability for use in novel situations, they ought to be developed and refined under circumstances which will provide best for functional use. This indicates that the elementary school has the obligation not merely to teach skill, in the conventional sense, but to provide numerous opportunities for children to use these skills in meaningful ways in a cultural context.

All the skills deal with symbolic material and hence with abstractions. Arithmetic, in particular, deals with highly conceptual material. In order that the abstractions of arithmetic, or of any of the skills, may take on meaning, they must be the outcome of more concrete experience. They must be the emergents of a long series of functional learnings with less abstract material. The teacher in the upper elementary school needs to pay very close attention to providing a wide range of experiences in which children can *put to use* the degree of skill they have already achieved and, in the course of using this skill, refine it and further extend it. The teacher cannot rely on the fortuitous appearance of such opportunities. They must be deliberately foreseen and planned. The planning for these opportunities is as important as, if not more important than, planning for the teaching of the abstractions themselves.

It is known that some repetition of response is necessary to fix that response and to smooth out and improve performance. A further qualification is usually made that this repetition must be meaningful to the learner, that he understand the significance of what he is doing, and that the practice must be done with the intent to perfect performance. However, there are various ways to repeat performance. One way is to repeat in relative isolation. Another way is to repeat through *using* the skill in a concrete situation. Both types of situation provide for repetition, but the latter provides for a type of repetition which may be more significant to the learner and may have more effect on his subsequent behavior.

It is felt by the author of this chapter that the psychology of meaning indicates rather clearly the superiority of repetition through functional use over isolated repetition. However, it does not necessarily follow that there is no place for practice on specific technical aspects of skill in the upper elementary grades, even though functional use of skill should be the basic pattern for repetition. In planning for specific practice, teachers should recognize that, for the most part, such practice should be organized on an individual basis, since the needs of individuals will vary greatly in this respect. Teachers should also be thoroughly aware that such practice will be of most value when meaning has been firmly established, and that relatively isolated practice is an adjunct to functional experience with a skill.

Although the problem of individual differences is discussed in another place in this chapter, it may be said here that the general pattern for repetition as described above can be an efficient means of providing for individual differences in the skills. Such a pattern does not divorce the cultural skills from their social context, it emphasizes opportunity for repetition through functional use, and it recognizes the need for individual opportunity to practice specific elements of skill in a purposeful and meaningful way.

The Selection and Use of Content

It has been suggested that the most fruitful kind of learning experience is one in which the learner is confronted with a problematic situation with which he must cope and for which his stock of habitual responses will not suffice. It is a situation of this kind which stimulates reflective thought. What has ordinarily been called "content" then becomes the data for thought in dealing with the problem which confronts the learner. The use of subject matter is a functional use in this case. It is not regarded or treated as a thing in itself. In the process of selecting and using certain content as the data for the solution of some problem, the learner achieves wider and deeper understanding and a more secure grasp of that particular content.

In many, if not in most, schools there is a pressing need for the introduction of more content and more varied kinds of content. For example, there is a need for more rather than less printed material, but it needs to be of a wider range of difficulty and designed to cover a wider range of interest. As has been indicated before, this material should be organized and administered as a library. Children should become accustomed from a very early time in their lives to using library techniques and other scholarly skills.

There is also great need in the upper elementary grades for curriculum materials of a concrete nature: materials suitable for conducting investigations in natural science and related fields and for a variety of work in the fine and applied arts. Audio-visual aids must be multiplied greatly. They should not be confined to a few of the better known but should include the whole range. Excellent sources of information for selecting and using visual and auditory materials are now available for teachers, and their use is spreading rapidly.

Some material which may be needed in the course of investigations being carried on by groups may not be available in printed form or in some other medium. In such cases it is desirable to go to the actual thing itself. Excursions into the community are being used by many teachers to give children more complete and vivid understanding than it is often possible to give them through vicarious experience. The same may be said for certain persons in the community. There are those people in every community who are not connected with schools but who have special knowledge or skill in important fields. Such persons can often be persuaded to contribute to the work of a group, and very often these contributions can be extremely valuable.

Not only must the teacher have a wealth of curriculum materials of these kinds at his disposal but also his attitude toward their selection and use should be one in which subject matter is used as the data for thought in clarifying and attacking problems which are of concern to the learner. There is a significant theoretical and practical difference between using subject matter in a functional and instrumental way in the solution of recognized problems and in using it in the usual academic fashion of "studying about."

A fifth-grade teacher, who for some years has introduced children to a study of the history of their own state as a part of their social-studies program, has found that each year the organization and emphases within the unit have varied. Since everything which is known about the history of the state cannot be taught in the time available, selection must be made. Content is introduced and used as it is needed in order to settle certain issues which children of a particular group find most important. From one year to another there are certain common learnings, it is true, but there is also diversity in the way in which content is used.

A similar observation may be made concerning the selection of content. All curriculum-building involves a selective process, since everything cannot be taught in twelve years of public schooling. It is entirely possible that content can be selected much more intelligently if the selection is done in terms of specific activities or specific problems being carried on by a specific group than if the attempt is made to select it in terms of some long and arbitrary sequence which may be unrelated to the work of any given group of children. At any rate, it seems clear that curriculum construction must provide for a much more flexible type of content selection than it has often done in the past. While it is unfortunately true that the ability to select and organize content is beyond some elementary teachers, the fact remains that the improvement of instruction has much to gain from this direction. This lack on the part of some teachers illustrates the great need for more and better supervisory service. Many teachers who cannot do significant curriculum work at the present time can learn, if they are given encouragement and help.

Providing for Continuity in Learning

Experience is continuous in nature. One episode in the life of an individual is an emergent of previous occurrences. The organism meets and interprets new situations in terms of previous learning. It has already been noted that learning with meaning depends in great measure on the continuity between novel learning situations which are provided and the previous experiences of the learner. Teachers have usually been sensitive to the problem of continuity, but traditionally they have sought to solve it by elaborate efforts to organize content in some strict, logical sequence. From these efforts have come highly organized and inflexible courses of study and related materials.

Many times these materials have been prepared by persons or committees of persons who are far removed from any close contact with children. The use of these materials in guiding classroom practice has tended to foster the ignoring of individual differences, learning below the level of understanding, and actual lack of continuity in learning experience.

Because continuity lies in the experience of the learner, rather than in the content, and because meaning is a property of behavior, rather than of content, any highly organized curriculum procedure, such as that based on textbook sequence, for the upper elementary grades is questionable. The type of procedure which seems to be indicated is that of planning in terms of a specific child or group of children. This planning is a very crucial matter in providing good learning experiences, and it should be done very carefully. In planning for continuity, the previous educational history of the group and of individuals within the group must be taken into account. This does not mean merely, as it sometimes seems to mean to some people, determining what the achievement of the group or some one individual has been as revealed by standard tests of achievement and other measures. These data are important, but of even more importance is the kind of experiences which have been provided for the child in previous years, the kind of undertakings in which he has been involved, and the units of study which have been developed. These things differ for different groups and individuals from one year to the next. Each group has reacted differently, has displayed certain well-defined interests and abilities. These things must be taken into account if even a semblance of continuity is to be provided, for the new experiences which are planned must be planned in terms of the experience the child has already had. Schools should not rely on the memories of staff members to furnish such data. School records should show precisely and in as much detail as is consistent with the time available the previous experiences of children in the school. There are techniques for doing this, and the use of such techniques as curriculum logs and anecdotal records is spreading among elementary teachers.

The nonschool environment of children is quite as powerful in determining present educational needs as is the school environment itself. Once again the basic principle of continuity gives guidance. Children will understand the new situations provided by the school in terms of what they already know, and much of what they already know they have learned outside the school. It seems reasonable to suppose that the new experiences which are planned should take into account and treat as valuable resources for new learning those things with which children have become familiar in the home and in the larger community.

The home and community backgrounds from which children come to American public schools differ greatly, even within a single school district. A child who comes from a deprived and meager home environment presents quite a different educational problem than does one who comes from a home which is rich in cultural opportunities. These children may have been born on exactly the same day, and their mental ages may be exactly the same, but the problems they present to those who are to arrange their school experiences are actually quite different. The more the importance of the nonschool environment is considered, the more apparent it becomes that flexibility in curriculum construction, that the selection of content in terms of specific groups of learners, and that strict attention to previous history both in school and out are essential for providing for continuity in learning experience.

Providing for Motivation

In a previous chapter of this volume it has been pointed out that human motivation, occurring as it does in the complex social environment, often resists any easy classification into the conventional categories of intrinsic and extrinsic. It can be said with reasonable surety that the level of motivation for any particular child or group of children will depend on the suitability of the environment which is provided by the school. To the degree that the learning situations which are provided are planned in terms of their suitability for the particular developmental status and previous experience of children, to that degree will the problem of motivation be solved. It has long been advocated in educational literature that the best school program is one which enlists and builds on the known interests and abilities of children. Although this principle has sometimes been misinterpreted to mean indulgence of the idle whims of children, it is widely acknowledged to be a valid principle of method and one which is supported by findings in experimental psychology. Purely extrinsic rewards and punishments are avoided by skilful and experienced teachers because of the relative ineffectiveness of these motives in producing desirable learning. In so far as the improvement of instruction is concerned, there is probably no substitute for the provision of a program of activities which enlist and expand the interests of children. When programs of this kind are provided in elementary schools, the need for obviously extrinsic devices will be slight or nonexistent.

Individual Differences

Although vast bodies of data are at hand to document the fact that individuals of the same age-status vary widely with respect to a large number of specific traits, knowledge of how to deal with individual differences in the elementary school is by no means as imposing as the knowledge that the differences exist. Schools have always tried to cope with the problem, usually in ways which really have been designed in the hope of eliminating or minimizing differences. Traditional methods have involved ability grouping, retardation, acceleration, and intensive remedial tutoring. Modern trends have been in the direction of individualizing instruction within the school group through provision of a variety of materials of instruction and attention to individual needs in instruction. There is some evidence, although it is far from conclusive, that individualization of instruction within the classroom is productive of better achievement when the outcomes of such instruction are compared with the outcomes of traditional procedures.[4]

There are, however, certain dangers inherent in relying exclusively on highly individualized instruction as a method of providing for individual differences. In extreme form, this procedure can become little more than tutoring, and learning may thereby be divorced from the basic cultural context in which it should operate. A similar objection could be urged against any plan of school organization which tends to put the learning of the common skills on an individual basis and the arts on a social basis. Such a form of organization may tend to take the common cultural skills of communication and number out of a social context, in which they will later need to operate, and to invest them with an academic and isolated character.

An over-all working hypothesis for providing for individual differences in the upper elementary grades is not easy to state. However, the most promising departure in terms of what is known about the social character of learning appears to be provision for differences within the social setting. For example, if a sixth-grade class is studying pioneer life in its own state, not every child can use the same materials with equal profit and facility. Some can locate and use reading material which is of a complexity and difficulty far beyond the sixth-grade level. Others in the group can use only reading materials which are elementary. Some can make objects illustrating pioneer life, others can interview persons in the community, still others can help in locating places in the community for the group to visit. These things can be shared by members of the class, more material can be used, a wider range of profitable experiences can be provided for all, *and more learning for everybody can result.* Further, and very important, is the fact that all members can make genuine contributions and receive recognition for having done so.

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[4] Cf. Daisy M. Jones, "An Experiment in Adaptation to Individual Differences," *Journal of Educational Psychology,* XXXIX (May, 1948), 257-72.

Learning situations should always be designed so that each individual can contribute to the total enterprise of the group of which he is a member and on a level commensurate with his ability. Recognition must be given, of course, to the fact that these contributions will vary qualitatively and quantitatively. The need for individualization of instruction is not minimized, but the learning which goes on is connected with the social setting and is not purely individual in nature. Such procedure undoubtedly requires a high level of understanding and skill on the part of the teacher. The need for more study and experimentation in this field is apparent.

SOCIAL LEARNING IN THE UPPER ELEMENTARY GRADES

Unity in Learning Experience

It has been emphasized throughout this chapter that all school learning takes place within a social environment and that the content of instruction takes on significance for an individual only as he grasps the cultural significance of what he learns. It has also been pointed out that the fairly common belief that there are some learnings which are purely social in nature and others which are purely intellectual is false. The child reacts to the complex environment which the school provides, and in the course of his experience in that environment he not only learns subject matter but also a great complex of social habits, attitudes, and predispositions.

Elementary-school teachers have a great obligation to provide for social learning and to provide opportunity for personal and social development of each child. In doing this planning the teacher must take into account the whole school environment of the group, not merely some isolated part of it. He must take into account the whole range of activities which he provides for children. One of the criteria which he must use for the evaluation of his program is concerned with the extent to which each activity contributes to desirable social learning.

The Minimum Essentials for Good Social Learning

Lists of the specific needs of children for good social and personal adjustment can be very long and detailed. There is no space in the present discussion for listing these needs or for a discussion of them. However, since provisions for good social learning are so important to the teacher in the elementary school, it seems well to mention a few which are fundamental. Recent studies serve to reinforce the common-sense belief that learning, achievement, and the actual amount of productive work done in any group depends directly on the degree to which there is mutuality of purpose among members of the group and between the group and the teacher. Some investigators have been able to demonstrate in rather dramatic fashion that the behavior of individuals in a group, as well as the behavior of the group as a whole, can be changed significantly merely by altering the pattern of social organization within the group.[5]

At the present time it is possible to say with considerable confidence that the kind of situation which will provide best for social learning in the elementary school is one in which a child lives and works in a stable social group in which he finds a secure place, in which he engages in activities which are of meaning and importance to him, and in which he is able to make worth-while contributions to the work of his group and to receive recognition for his contributions. When these conditions are met, social and individual development will proceed satisfactorily. Such a generalization conforms to what is known about the fundamental patterns of learning as well as what is known about social development.

IMPLICATIONS FOR ORGANIZING INSTRUCTION

An entire chapter of this book is devoted to a discussion of the implications of findings in learning for the organization of instruction. However, in order to round out the proposals for practice in the upper elementary grades which this chapter has presented, it seems wise to point out a few considerations concerning the organization of instruction in the upper elementary grades.

The point of view of the author of this chapter is that our greatest need at the present time is to arrange instruction so that learnings are effective in general experience. Because of reasons which have been pointed out in this chapter, it is believed that, in order to achieve this objective, a high degree of integration in learning experience and content must be achieved. As Hildreth[6] has pointed out, there is considerable difference between integration and mere correlation, and the former is undoubtedly superior to the latter. It may be assumed that any type of school organization that facilitates instruction of this kind is, in fact, a desirable kind of organization and at least deserves to be tried.

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[5] A study of great significance for elementary teachers is: Ronald Lippitt and Ralph K. White, "Social Climates of Children's Groups," *Child Behavior and Development*, pp. 485-508. Edited by Roger G. Barker, Jacob S. Kounin, and Herbert F. Wright. New York: McGraw-Hill Book Co., 1943.

[6] Gertrude Hildreth, *Child Growth through Education*, p. 77. New York: Ronald Press, 1948.

Confusion often obtains in discussions of types of organization because of the difficulty in distinguishing between differing types of practice which often go on under the same name. In practice, the term "experience unit" means one thing to some teachers and something quite different to others. There are those who believe that the best of what many call highly traditional instructional organization can be salvaged, improved, and made to serve the purposes of newer practices. On the other hand, there are those who believe that research in the field points unswervingly to completely new departures in organizing instruction. So far as this writer is concerned, it is felt that the evidence points strongly toward a kind of organization wherein:

1. *Specific* curriculum-planning is done by children and teacher. This planning operates within very broad boundaries and is not restricted by any preconceived sequence as set out in textbooks or courses of study.
2. Experiences develop around central problems or fields of study which connect with pupil understanding and motivation and which have high potential educative value.
3. The specific learning activities to be arranged, the types of content to be utilized, and the direction which subsequent experiences are to take are left to the judgment of the teacher.
4. The teacher is responsible for the total educational experience of the children assigned to him, but he may have the assistance of persons with competence in special fields.

Whether these proposals can be called "progressive" or "traditional," whether they have to do with the experience unit or with something else is of no great consequence for practice. What is of consequence to practice is whether these proposals are in accord with the principles for improving instruction, as they have been discussed in these pages, and whether the validity of those principles themselves is attested by our present knowledge of how learning goes on. It is on this basis that the reader should make his judgment in this highly controversial field.

It is possible that departures entirely different from anything we now have will need to be developed in the organization of instruction in the elementary grades. On the other hand, there may be aspects of the older assign-study-recite-test pattern of instruction or the unit-of-work pattern which will be found valuable for certain purposes, perhaps when combined with other techniques. It is certain that there is much to be discovered in this field, and the more school workers combine to study and experiment and appraise, the more we will know, and the more secure will be our basis of practice.

EVALUATION IN THE UPPER ELEMENTARY GRADES

Pupil Participation in Evaluation

The fundamental pattern for educational experience which has been advocated in this chapter is one in which children participate in evolving ideas to deal with situations, in carrying out those ideas, and in evaluating the outcomes of their actions in terms of their original purposes. Thus, evaluation is regarded as a continuing process which is intimately related to the learning process and is not something which lies outside the learning experience. It is felt that continued experience of this kind will serve to make children objective in their appraisal and will serve to develop skill in use of the pattern of inquiry. Children can be discerning and critical when they are asked to appraise outcomes which they understand and with which they are deeply concerned. One group of children, who throughout their elementary-school experience had been urged to appraise their own progress, formulated some simple criteria to evaluate their progress at the end of a unit of work.

1. "Did we find out what we wanted to know?"
2. "Was the way we went about it a good one?"
3. "Was it easier to study the topic this time than it was the time before?"
4. "Did we learn any new ways to make studying easier and more interesting?"[7]

As teachers know, children continually appraise the work of their teacher, the kinds of things they do in school, the materials with which they work, and so on. It is proposed here that pupil evaluation, instead of being ignored or suppressed, be used to appraise the educative process itself, to contribute to the intellectual and social growth of children, and to improve the work of the school.

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[7] Laura E. Williams, "Michigan: A Report on a Unit on Michigan Developed in the Fifth and Sixth Grades of the University Elementary School," p. 13. Ann Arbor: University Elementary School, University of Michigan (mimeographed).

Evaluation by the Teacher

We have come a long way since the time that a teacher could administer an essay examination in the upper elementary grades, read the responses, and feel satisfied that the results of his teaching efforts and the learning of children had been appraised satisfactorily. The development of objective tests of achievement in the present century has given teachers relatively precise instruments for measuring certain kinds of outcomes. Even though these instruments have often been misused by teachers, the fact remains that they have given a kind of precision to the appraisal of achievement which was lacking before, and they deserve an important place in teacher evaluation of the development of children. Much, of course, depends on the way in which such instruments are used by teachers and the point of view which motivates their use.

There are few, if any, schools at the present time which openly advocate the belief that the elementary school is concerned only with the subject-matter achievement of pupils. A school which has as its serious purpose that of contributing its share to the total development of children finds many other things to appraise. Progress has been made in the development of instruments for assessing the social and personal adjustment of children, and more progress in this direction may be anticipated. One important source of data for evaluation is in the records kept by teachers. Journal-recording of significant pupil behavior can be a very valuable adjunct to data collected by other means.

Evaluation has no meaning except as it is a process of attempting to determine to what extent a school is realizing the aims and objectives it has set for itself. When the aims and values which govern the operation of the school are clearly defined, teachers and administrators are ready to collect data from all possible sources to appraise their efforts, but, until this clear definition is achieved, evaluation is apt to be only a mechanical and meaningless gathering of unrelated facts.

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CHAPTER XII

IMPLICATIONS FOR IMPROVING INSTRUCTION IN THE HIGH SCHOOL

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INTRODUCTION

Several of the earlier chapters, written from the standpoint of students of the psychology of learning, have suggested principles of learning relevant to particular types of educational objectives commonly sought in the schools. They have described and analyzed processes of learning which are essential in the education of high-school pupils and adults as well as of young children. These principles can be of great value to the high-school teacher when they are used along with other guiding principles in planning and conducting instruction. But, since good teaching is a complex art, it is necessary to employ a methodology by means of which these principles may be utilized under school conditions in which more than one educational objective is sought from the same complex of activities (**28**), so that the interrelation of the principles in the various chapters is taken into account. Furthermore, actual class instruction involves the teaching and learning of a number of pupils in the same class. A helpful methodology must, therefore, deal with the educational guidance of a group of pupils with corresponding recognition of the variety and interaction among the pupils in the group.

The approach to class instruction developed in this chapter emphasizes the factor of interaction among the students in the class as well as the relation between teacher and pupils. This way of viewing teaching and learning in the classroom has emerged out of new findings from studies in social psychology. The attention given here to group interaction in the class does not deny the principles of individual learning which have been formulated from many experimental studies and outlined in the preceding chapters. Rather, the implications of the facts of group relations simply add a new dimension. In suggesting some of these implications there is no attempt to nullify other tested methods for guiding learning, but the purpose is to indicate an additional facet of attention and a methodology for dealing with this social aspect of class instruction. In short, this chapter explains some of the important factors that affect the motivation, the direction of attention, and the activities of students as a result of their being members of groups, and suggests how these factors can be utilized to facilitate individual learning rather than to interfere with it.

To explain the operation of these factors in learning is the purpose of the next section of the chapter. To suggest how these social factors may be utilized to facilitate instruction, the succeeding sections outline some aspects of methodology and consider the teacher's role therein.

SOCIAL FACTORS IN CLASSROOM LEARNING

A comprehensive methodology of instruction will utilize the results of two sorts of research: (*a*) Research on the processes of learning by individuals, as reported in earlier chapters of this yearbook; (*b*) research that deals with processes of group interaction. Studies of learning by individuals emphasize processes of personal integration within the social environment; the group studies emphasize processes of group development as one aspect of the individual processes of integration.

Some key principles selected from the preceding chapters which serve as underlying assumptions of a methodology of high-school instruction are:

1. Children have need for *affiliation*, *approval*, and *aggression*.[1] These needs are pervasive; they operate in every social situation, including the classroom.

In a classroom, these needs result in the development of group controls. The definition of behaviors through which group approval is possible becomes formulated as a set of *group standards*. The possibilities and modes for expression of aggression are determined largely by the *climate*—by the feelings of acceptance and rejection, of independence and dependence, of emotionality and objectivity.

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[1] Hilgard and Russell, chap. ii.

When these controls are inappropriate to individual needs, the achievement by individual students tends to be apparent rather than "real," the learning does not become part of their normal behavior, and the group controls have more the quality of extrinsic rather than of intrinsic motivation **(17, 18)**.

2. There is, in every culture, a developmental sequence of learnings whose quality of accomplishment determines the child's place in the culture.[2] Children may be expected generally to have high motivation for these developmental tasks and to have considerable anxiety over failure in their learning of them.

Teaching which denies or attempts to prevent behaviors of children related to the working out of these tasks becomes a source of additional problems to the child; and the necessity for solving these problems interferes with the possibilities of school achievement.

3. The child's generalizations about the relationships between himself and the world, and among the objects and people of his world, tend to "take priority over new experiences."[3] These generalizations become organized in a more or less self-consistent and necessary way for each child; and he seeks to maintain this seemingly consistent organization that he has worked out.

Teachers may expect to find resistance to experiences which the child perceives as calling for change in his pattern of "generalizations." The method of diagnosis and treatment of symptoms of resistance determines in a crucial way the extent to which learning will be internalized and self-realizing.

4. "Generalizations are products of problem-solving and are attainable in no other way."[4] The child will stop at whatever level (consciousness, explicitness, confidence, breadth, etc.,) of generalization satisfies his needs and purposes.

Cognition is seen as a "provisional try" at generalization.[5] Cognition is a process of abstracting from total experience, and its outcomes are tentative. In *consciously directed* problem-solving, "provisional trys" become hypotheses, and analysis of the requirements for solution of the problem provides "search models" or criteria to be met by the generalization sought.[6]

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[2] Tryon and Henry, chap. vi.

[3] Tryon and Henry, chap. vi.

[4] Brownell and Hendrickson, chap. iv.

[5] Anderson and Gates, chap. i.

[6] Thorndike, chap. viii.

5. Learning is multiobjective. No activity represents unidimensional experience. Thus, Ragsdale points out that through motor activities the individual "puts into overt expression and effect his conclusions about situations and events, including his own views and emotions."[7] Brownell and Hendrickson point out the possibility of integrating emotional and motor meanings into concepts.[8] "The apparently significant effect of the casual and incidental in modifying children's attitudes"[9] implies the existence of meaningful problems which, from the teacher's standpoint, have been customarily regarded as peripheral.

Studies within the frame of reference of the individual learner support the basic contention that learning is an active response of the organism, that it is selective and depends upon unique interaction between personal and cultural forces in every situation, and that it is a complex process of experimentation taking place simultaneously on many experience fronts.

Within the commonly ignored fringe of "concomitant" learnings are included the processes by which the class group becomes a social organism and through which it exercises its control over individual learning. An efficient methodology of instruction must recognize fewer and fewer types of learning as "concomitant" and more and more types of learning as essential to the processes and conditions of school achievement.

A methodology of instruction is concerned not only with describing the processes of learning directed to the school objectives but also with describing the conditions under which learning takes place. Chapters ii, v, and vi indicate clearly that experiences with interpersonal relationships strongly influence the child's control system of beliefs and values. In effect, although he is an individual, he is also a representative of various social groups which have great influence on him **(16)**. Even when alone, he is influenced by his group affiliations.

The realization of the very great influence of the classroom group upon individual learning follows from a consideration of the implications of much of the recent research in social psychology. The general picture which emerges is as follows: First, the classroom group is a major part of the peer society. Second, the classroom group is an artificial peer society planned and maintained through very strong societal pressures, primarily for the benefit of society itself. It is a peer society under continuous scrutiny and subject to interference by adult authorities. Third, within the classroom group the individual is under considerable pressure to try new things, to attack new problems, to relate himself to a host of new and often disturbing materials, ideals, and attitudes, and to adjust to new conceptions of himself. In effect, within a classroom group there occurs a channeling of attitudes which exerts more or less influence upon the individual conduct from that time forward.

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[7] Ragsdale, chap. iii.

[8] Brownell and Hendrickson, chap. iv.

[9] Harris, chap. v.

In considering the nature of the classroom group as providing an important part of the conditions for learning, it is appropriate to recognize four functional interrelationships between the individual and the group:

1. The group develops and reinforces the individual's need to learn. The fact that activities in the classroom require concerted action from all the students, coupled with the fact that no two students perceive the group in the same way, gives rise to problems which the individuals are strongly motivated to solve. Under an appropriate methodology of instruction, these motivations can be channeled into the tasks of school achievement.

2. The classroom group is a field for individual self-realization. There is social interdependence in the jobs of planning and working together. There is also emotional interdependence. The manner in which this interdependence is controlled by the teacher and the group determines the opportunity for development of individual creativeness and resourcefulness. Under some kinds of group conditions conformity becomes the goal; under other kinds, individual growth and maturation become the goal. It is because of this latter possibility that instructional methodology must take account of group factors.

3. The classroom group provides needed opportunity for testing the individual's developing social concepts and conduct.[10] The group is a laboratory in which the responses of others toward the student show him how valid his concept of social cause-and-effect relationships are, how appropriate his behavior is perceived to be in specified roles, and the like. Every participation of the individual gives him a chance to test such concepts and conduct, to modify them, and to practice further.

4. The group exerts a powerful influence upon the individual's

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[10] Compare Tryon and Henry, chap. vi.

cultural adaptation. Basically the group affects cultural adaptation because of the fact that everyone identifies himself as a member of several groups simultaneously. To the extent that these groups are meaningful to the individual and to the extent that the mores of the groups are different, the student is bound to develop conflicting attitudes toward authority and toward co-operation, varying concepts of the worth of his own work, and other similar inconsistencies. But cultural adaptation lies in the similarities in the meaning of participation in various groups rather than in the differences. There are common elements that the individual can recognize from group to group; such things as how group standards develop, the meaning of social approval, skill in diagnosing forces in a group, sensitivities to other people's motivations, and understanding of intergroup relations. These common generalizations can be learned under effective guidance in group experience and thus contribute to cultural adaptation (**1**, **9**).

These four kinds of interrelationships between the individual and the group indicate both the influence of group membership upon the individual and also the opportunity it provides for highly motivated learning. However, the effective functioning of a group, particularly if it is to serve as a medium for highly motivated learning among its members, requires the operation of interwoven processes within the group, including such matters as establishing easy communication within the group, reaching agreement on a common value system, maintaining controls on co-operative efforts, learning how to direct effort at times of frustration, and establishing control of the processes of distributing satisfactions among all the members of the group so that there is a sense of appropriate reward for success in group participation.[11]

What is the significance of the foregoing analysis of group functioning? Schools are made up of groups of individuals. School learning is usually conducted with classroom groups. The fact of group membership serves as a powerful influence upon the individual student. This influence can be utilized to motivate learning (**24**). If ignored, the group situation may frequently interfere with effective learning on the part of individuals in the group. The influence of group membership upon individual motivations together with the opportunity the group may provide for various types of significant learning make it important to understand group processes in order to understand ways of guiding classroom learning. Facilitating growth of the group *as a group* is, therefore, an important part of the job of providing conditions under which school learning can occur efficiently.[12]

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[11] For further discussion of these processes, classified by Couey from a survey of research by Bales, see (**26**, **27**).

It is sometimes noted that a group, as it develops a more efficiently functioning structure, may show resistance to new experiences or to any change (**1, 4**). One may infer that expressions of resistance are grounded in fear. Some commonly occurring fears have been described by Main and Nyswander (**19**) and Redl (**21**).

Expressions of resistance provide valuable diagnostic evidence for understanding group problems. In the methodology of instruction, opportunity must be provided for such expression. Perhaps the major relevant attitude of the teacher is one of acceptance of the individual anxiety expressed in the group, and her most useful action is one of helping to clarify such feelings.[13]

In summary, a satisfactory methodology of instruction must be adequate to utilize facts and principles relating both to individual learning and to group interaction. The conclusion emerges that the efficiency and quality of the group processes determine very markedly the quality and quantity of school achievement by individuals in the group. Perhaps the major requirements of the teacher are that he develop understanding of cause-and-effect relations between group-process problems and individual needs, attitudes of acceptance and objectivity toward all the members of the group, diagnostic insight in identifying group problems, and considerable skill in facilitating the group in dealing with its own process problems.

THE METHODOLOGY OF CLASSROOM LEARNING

A statement of educational objectives represents an analysis of the types of learning outcomes desired. If the objectives are wisely chosen, they represent changes which the school seeks to bring about in the behavior of its students, so that they will acquire behaviors that are important to society and that contribute to their individual happiness. The purpose of instruction is to facilitate learning in these directions. The content of instruction is the set of problems whose processes of solution result in the desired learning. The starting point for consideration of methodology is appropriately the definition of the sorts of problems whose solution constitutes learning. Problems will be considered to be of different "sorts" to the extent that they must be dealt with by different procedures. Because problems exist at all levels of consciousness and awareness in the problem-solver, in any given situation some of the problems can be identified only through inferences from the learner's behavior. The kind of behavior from which one infers that a problem exists is primarily experimentation (**2**).

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[12] Swenson, chap. x.

[13] Tryon and Henry, chap. vi.

Experimentation may be conducted consciously by the learner and may be planned and directed toward definite goals. In this case the problem can be explicitly stated and the resulting learnings may be functional understanding of social principles, scientific laws, and problem-solving strategy. It is about such problems that curriculums are typically organized. Such learning is culturally oriented, and its cognitive content is organized, objective knowledge.

Experimentation may also be directed to the problem of learning one's role in a social group, finding out through the reactions of other people what sort of person one is, what social aspirations are "realistic," and what contributions to the group he needs to learn to make (**23**). The need is to reconcile one's conceptions of himself with his idea of how others perceive him. Attempts of individuals to meet this need result in problems of group process. Because one's personal-social needs are modified in the group process, there is likely to be a good deal of individual tension involved in the solution of the problem, and its cognitive content consists of the perceptions and conceptions of each individual. His own conceptions and the perceptions of others of him are, of course, affected by experiences in other groups and through reading and other means of communication.

A comprehensive methodology of instruction should provide guidance for the teacher regarding procedures that will enable him to deal with problems of group process and problems of school achievement. The development of such a methodology requires the spelling out in greater detail of the interrelationships between these two types of problems. Several of these are elaborated in the following paragraphs.

1. Group-process problems are mostly at a subconscious level of awareness. They are problems about which there is feeling but not necessarily conscious recognition in the group. Such problems include visualizing and testing various methods of working together, finding the roles that are needed in the group for the solution of the problem, discussing how the efforts of all may be co-ordinated, making careful assessment to discover what resources not now in the group are needed.

These problems can generally be identified, not so much from any verbal formulation as by inference from observation of the way in which the group works. The group-process problems are solved when the feeling associated with them has been diminished to a comfortable and tolerable level. During solution of the group-process problem, decisions are likely to be made. Some of them are not consciously recognized as such: They are agreements about attitudes toward the teacher, the school work, and outside groups; and these agreements hold in force until some occasion requires their change.

Miss G., a chemistry teacher, got along well with the class most of the time. But she always dreaded "dangerous" experiments, such as "The Preparation and Properties of Chlorine," because someone in the class usually, apparently through carelessness, would get too large a dose and have to be taken, choking and coughing, to the nurse's office. Mr. K., another chemistry teacher, almost never had any trouble with "dangerous" experiments. Miss G. and Mr. K. seemed, for the most part, well matched with respect to strictness, knowledge of chemistry, amount of planning shared with pupils, and the like.

Miss G. always introduced the chlorine laboratory activity by saying that it was dangerous and frequently resulted in someone being overcome; that under no circumstances must anyone use larger quantities than the directions called for; that if the flame was turned too high, they would be unable to handle the volume of gas produced. Mr. K. introduced the laboratory work with the question, "What are some of the points of special precaution today?" and then calmly joined in the discussion from time to time.

The group-process problems produced by Miss G. included at least the following: deciding in what way to deal with Miss G.'s obvious anxiety (accept it; reject it); handling its own frustration at being treated like children on this occasion; redefining the boundaries of individual initiative, freedom, and responsibility as a result of Miss G.'s abdication of her leadership role. Mr. K.'s introduction produced no new group-process problems. He enabled the group to tackle the matters of danger and precautions objectively and responsibly.

2. The school-achievement problem is focused on a communicable educational objective, on conscious planning of activity, on the demonstration that a new insight has been learned, an attitude changed, or a skill developed to a socially satisfactory level of proficiency.

Under usual school procedures, the solution of a school-achievement problem meets only a small part of the total needs of any individual in the class. This follows from the fact that it is usually selected so that it can be consciously attacked and solved by almost every individual in the class. The unique needs of individuals in the class are not commonly considered in setting up these school-achievement problems.

Mr. F. became converted to planning his activities through discussion with his pupils. As his first attempt in this direction, he told his social-studies class that in the new unit on housing they were free to select their own problems and to plan their activities. In the discussion that followed, he carefully refrained from "prejudicing" the group decision, making no contribution beyond summarizing from time to time the alternatives so far suggested. Discussion was lively, then apathetic. The decision finally made was to start with an extensive study of the city zoning-laws and how they were enforced.

The "research" on zoning-laws seemed perfunctory, and Mr. F. was disappointed. Having selected the topic themselves, why were the students so uninterested? To get back a little interest, Mr. F. invited the alderman to talk to the class about zoning regulations in the local neighborhood. The alderman had some good stories, and the class took advantage of the discussion period following the talk. The first question seemed relevant: What would a person have to do to get permission to change five-room apartments to 1½-room kitchenettes? But then a variety of questions began to emerge: Do property values always go down when Negroes enter the neighborhood? Why are rooming-house neighborhoods "bad"? How are rents fixed? What is the "real" purpose of the property-owners association? Wasn't it too bad the city wouldn't let a house, given to an orphanage, be used for that purpose? Why are prefabricated houses not allowed in our neighborhood? Why is there more crime in slum areas?

Mr. F. was dismayed at seeing the content he had in mind for his various units being jumbled together; he was also disturbed that the students seemed to be taking advantage of the guest situation in going so far off the beam. Then he began to feel proud of the penetrating and intelligent questions the students were asking. In the discussion with the alderman, the students identified a host of challenging achievement problems that were closely related to some of their needs.

3. Both group-process problems and school-achievement problems are not only continuously present in the group but are necessary to progress. Without the school-achievement problem as a conscious focus, the group has no "concrete" material on which it can concentrate intelligent problem-solving methods or through which it can diagnose its own specific problems of process. But without the group-process problem, and the need to resolve conflict in feeling, a major

source of motivation for learning would be absent. As Hilgard and Russell point out (chap. ii), successful learning requires a maintenance of balance between the "immediate, compelling needs and interests of pupils and the more remote demands of the society in which the pupil and teacher live." The problem could be restated as that of bringing about a proper integration of common purposes centered around an achievement task with the sharing of feeling centered around personal-social problems of the group. To maintain this balance requires facility and confidence in continually diagnosing the on-going processes of learning.

In a particular twelfth-grade social-studies class, the educational objectives of the course are: (*a*) To develop understanding of the problems involved in the operation of a democratic government and the methods by which these problems are being attacked at the local, state, and national levels. (*b*) To develop an attachment for the general principles of the democratic system with its emphasis on the worth of the individual responsibility for fellow-men, freedom, and equality. (*c*) To develop skill in critical thinking about civic problems.

One of the major units is entitled, "How May We Crystallize Public Opinion into Law in a Representative Democracy?"[14] The teacher, in introducing this unit, showed a cartoon from a current magazine which illustrated some fantastic laws still on the statute books. The discussion began with the question, "Why would such silly laws be enacted?" The discussion brought out a number of hypotheses regarding the school-achievement problem, and it also indicated several group-process problems. Several members of the group did not express themselves in the discussion. Certain members of the group were using the discussion for the expression of aggression toward other members of the group. The control of aggressive behavior was not yet established in the group. These problems the teacher noted because there would likely be need to deal with them at a conscious level later on.

During the preliminary discussion, two questions emerged which continued to involve a large majority of the group. They were: "Do we have silly laws in force here in our community?" and "How do laws get on the books and get off the books?" As it became clear to the teacher that these questions were challenging to the group, the additional question was raised: "How can we find out whether we have silly laws in force and how laws get on and off the books?" This question turned attention of the group to problems of process: What could be done? Who could do it? How could the various tasks be carried out? The motivation of the class was high and could be maintained by continuing analysis and interpretation.

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[14] Chicago Public Schools, *Course of Study in Civics I.* Chicago: Board of Education, 1949.

In particular, the teacher had the insight to suspect that some of the discussion about silly laws and ways of changing them actually might be reflecting a variety of feelings in the class about some of the classroom and school regulations. He felt that the civics discussion was, in effect, not only a discussion of civics but a cloak under which was occurring a circuitous, semiconscious probing of the teachers' attitudes toward rules. The question of the right of designated authorities to pass laws seemed particularly intriguing to several of the students, and they returned again and again to different ways of raising this question.

The teacher decided to explore the situation further, on the grounds that civics-learning would be interfered with if the major preoccupation during civics discussion was the relationship between teacher and class. He, therefore, found occasion to point out rather casually that even teachers regulate some matters by rules and that it is not always easy to know if the rules are fair or if they are really needed. He was able to make this comment in a nondefiant, calm, objective manner that did not make the class feel that he was merely fishing for reassurances. A couple of students responded to the statement by attacking directly the rules governing homework assignments; but the lack of support from the class as a whole discouraged this sort of open attack. The class as a whole seemed unwilling to consider specific teacher rules—at least, not in the presence of the teacher—and, instead, they discussed how they might help the teacher set up fair rules. This led to the setting up of an advisory board and to the definition of its function as a steering committee for planning homework assignments with the teacher.

This board functioned rather formally for about a month. Its members, of course, had contacts with the other students outside of class, and they did a good deal of interpreting to the others of what sort of person the teacher was and how sincerely he was concerned with having a pleasant working relationship in the class. By the end of the second month, the board had almost ceased functioning. It was seldom called on by either teacher or class. This produced guilt feelings in the teacher and some anxiety in the class until someone pointed out that, for the last couple of weeks, the class had been arriving at its homework assignments by open discussion during the class period rather than by considering the committee's suggestions at the end of the class hour. The effort to deal with the feeling of resentment by the class against arbitrary teacher rulings had, in this case, led not only to a solution of the group-process problem but, along with it, to the release of considerably more energy for attacking the school-achievement problem, as shown by the change in the method of arriving at homework assignments.

Under the freer climate resulting from the students' recognition of the teacher's objectivity, flexibility, and nondefensiveness, there developed not only a heartening acceptance of the teacher as a friendly and fair-minded person but also much greater involvement in the schoolwork as significant in itself. The method of getting assignments through class agreement during discussion seemed satisfactory for a couple of months, and then it began to run into snags. It seemed harder and harder to find agreement. It was only after several days of tension at assignment times that the teacher made the interpretation that the trouble was no longer that people didn't want to work but that different individuals were motivated to work on different aspects of the problem. Acceptance of this interpretation led eventually to the formation of subcommittees on such occasions, and they operated in this manner from time to time from then on, being reconstituted on each occasion when differentiation of work seemed desirable either as a way of covering more material or as a way of adjusting the content to the individual student's needs.

These changes came about because the teacher was sensitive to the class feeling and because he felt it was important to take feeling into account (i.e., to accept the students as people). Each new departure was discussed and tried out as an experiment. Criteria were identified, and the success of each such experiment was continuously appraised. Techniques and procedures were dropped as the class outgrew the need for them.

It seems clear that the teacher must normally follow the lead of the group in diagnosing and attacking group-process problems but that the group should normally follow the teacher's lead in becoming involved in school-achievement problems. For the former to be possible means that the goal and the available areas for free choice must generally be broad and extended in the group, even though decisions to engage in particular activities may require a much more limited range of goals during the course of the activity.[15] Moreover, the goal structure must be shared by all so that criteria for action are explicit, common evaluations can be made and communicated, and the student can locate the group's position at any time.

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[15] See chap. ii.

4. When the feelings of the group mount in intensity above the group level of tolerance, the group will automatically concentrate its major effort on its own process problems which give rise to the feeling (**19**). At such a time, the group may appear to be making little progress on the achievement problem and there may be an apparent regression. The cycle of building up subconscious tension while apparently working on an achievement task followed by an emotional explosion and then a return to the task is all too commonly observed. This kind of cycle results in inefficiency with regard to the solution of both types of problems; first, because the school achievement is interfered with and jeopardized; second, because when feelings run high the group does not have sufficient objectivity to work effectively on problems related to its own functioning; and third, because the emotional ups and downs make it impossible to establish a consistent procedure that can be depended upon for guiding learning.

All the students in a high school attended a 40-minute "homeroom" once each week. The students shared many classes together, were able to talk over most scholastic problems with the teacher directly involved, and had regular appointments with their counselors. The student affairs were pretty much managed by three strong student committees. As a result, the "homeroom" classes had to "make work," and on occasion resorted to student-talent shows and baseball games.

Miss T. faced the problem squarely with her homeroom and suggested that they might study human-relations problems through spontaneous drama. The first drama dealing with the problem of discipline in the library went off well, with much satisfaction and insight gained by the students. Miss T. lost her own self-confidence, however, when the homeroom teachers' committee attacked her use of homeroom time for such matters. From this time on, explosions occurred at almost every homeroom meeting. "Do we have to do this?" "This is kid stuff." "I really need the period to study algebra," and other such remarks symptomatized these times of revolt.

Miss T. always listened to the remarks, accepted them without expression of resentment, and explained that this was experimental, that maybe her program wasn't too good, that if they would rather do something else they could. At this conciliatory attitude and the threat of throwing them completely on their own resources, the group would settle back to work—until next time.

Appearance of the explosion-explanation-production-explosion cycle seems most common when the leader is unconfident, the goals unclear, and the students' role in the class ambiguous. Among the common types of "explanations" for handling explosions are: (*a*) It isn't my idea; it's just necessary if you want to go to college; (*b*) I sympathize with you and think this is unfair, but there's nothing we can do about it; (*c*) I work so hard to make it interesting and am at my wit's end; (*d*) it isn't fun now but it is for your own good to prepare you for a less sheltered life; (*e*) I gave you all your chance and you muffed it—now it appears I will have to take over.

Miss T. had found a good solution to the homeroom problem, and it worked well the first time. But the critical attitude of her colleagues put her in an intolerable position: Either she must fail so that her colleagues would continue to be more or less "friendly," or she must succeed so that the class would have a profitable experience. Miss T. was, of course, unaware of the deep conflict within herself. She reacted to it by becoming too eager to avoid possible failure; she could no longer tolerate the seemingly "inefficient" and chaotic periods which the class would have gone through in arriving at real and meaningful situations for itself. The explosions of resentment were never seen by Miss T. as basically caused by her own anxiety over failure, and, since their causes were not understood, no solution was possible. Miss T. was thrown back on threats of punishment and of withdrawal of support as the means to quell the revolt.

The avoidance of such debilitating cycles requires adequate reporting to the group of some of the facts about its own operation, sufficient permissiveness that the expression of feeling is not ruled out as irrelevant, diagnosis of the situation, and an interpretation which formulates the group-process problem at the maximum level of explicitness that the group is able to tolerate. The nature of this interpretation is crucial, and considerable skill is required for success: On the one hand, it is necessary to avoid smoothing over or squelching the manifestations of the group-process problem, and, on the other hand, it is necessary to avoid allowing it to degenerate to the level of personalized and interpersonal conflict and reassurance (**12**).

5. Group-process problems, because they grow out of emotional elements rather than strictly intellectual ones, tend to build up over a longer period of time than do the school-achievement problems. The solution of one may not coincide at all with the solution of the other. The group's problem of deciding how to handle an authoritarian teacher may be worked on all semester without success. Occasionally,

however, the group may reach its own solution within the first hour—if the teacher tends to be defensive—for they may then make him an alien outside of their circle.

After a period of three days, the class in vocational guidance made a number of decisions—with considerable "teacher guidance." It was decided to study occupations as related to educational preparation and on-the-job experience. The method of study was to be interview of a sampling of men in different occupations, using pairs of class members as interviewing teams.

As an aid to forming the interview team, each student was requested to fill out a schedule showing his classes and his regular appointments outside of school so that partners could be chosen on the basis of available time.

Filling out one's schedule is a job that can be done in ten minutes. The class took forty minutes. There was conversation about the nature of out-of-school appointments, comparing of notes about other classes, discussion of football practice, and the like. The teacher issued a few orders about going to work on the schedule. These orders were disregarded, and he was faced with the problem of either giving up and losing face or of becoming very tough and also losing face.

In such a crisis, it is often hard to think straight. The teacher could see that something he couldn't understand was happening. The idea of interviewing had seemed attractive to the class. Why this inability to take the first step?

It took an hour of discussion during which the teacher spoke frankly about his doubts that the class was really ready to do the job, to discover some of the problems. Among the feelings expressed (whether reasonable or not) were: We don't know where we are going. I am fearful of taking a busy man's time in interview. What if he won't talk? Why don't we get information from a book or invite speakers in? Whose idea is all this, anyway?

It seems clear that, as is frequently the case, there had been many unresolved questions in the minds of the students. These questions suddenly became important *at the time when the first concrete step toward action had to be taken.* The feelings of insecurity had been building up all during the teacher-dominated planning, and without anyone quite understanding what was happening. These feelings mobilized into a real problem of resistance on the occasion of filling out the schedules. The emotional aspect had been slowly building up, even though a whole series of small problems had been solved and decisions made—at the level of verbal agreement.

6. Raising the group-process problem from the subconscious level of unexpressed tension to the conscious level of shared understanding may be very markedly helped by informal discussion groups and cliques, or even at parties outside the class situation. This is particularly true in the stages when the group members are feeling each other out to see if something that is perceived as a problem by one individual is also perceived as a problem by others. Such freedom of action is inhibited in a police state by the internal spy system which is set up partly to prevent such possibilities for mobilization of feeling. The importance of these informal groupings acting in the service of the formally organized class is not generally recognized by teachers (**14**). In some schools, however, providing such opportunities is one of the major values of the core-curriculum program.

In G High School, the parents became much aroused against the cliques in the school. These cliques were perceived as exclusive or defensive; they divided the student body and led to many hurt feelings.

The teachers discussed the clique problem in faculty meetings, and, through this means, each teacher saw that he was not alone in regarding this as a problem. Thus reinforced, several teachers attempted in their own way to deal with the problem.

Teacher X, in mathematics, reseated the one important clique in her class so that no two members were together. As a result, communication was driven underground; instead of whispered asides, the clique developed its own signal system, using gestures of various sorts. The problem of communicating became so difficult that the clique members had hardly any energy left for working on achievement problems.

Teacher Y felt emboldened to attack the clique more or less openly. When the members were not paying attention he would call on them. When they laughed at a private joke, he would ask them to share it with the class. Such behaviors, of course, gave the clique further reason and need for existing as a defensive coalition.

Teacher Z never singled out the clique in any way. At a time when the majority of the group seemed rather bored and the members of the clique were talking among themselves, he proposed that the class divide up into small groups for ten minutes and then report suggestions for what steps they should take next. The clique stayed by itself, and the others formed additional groups.

At reporting time, the teacher called for reports from the different groups. The clique was the fourth group called on. Their report added only one suggestion to the six already presented. The suggestions were discussed publicly—they were the property of the class, not of the individuals who presented them. The course of action finally adopted was created from elements contributed by several of the smaller groups, including the clique.

A number of interesting changes occurred from this point on. The clique members seemed to do less talking among themselves and more to the class. When the class divided into discussion groups, some members of the clique would sit with other groups. Two of the clique members who had always avoided the teacher came in after school to talk over their personal problems—a significant step, in that they were recognizing themselves as individuals separate from the clique.

The clique did not, of course, break up. It was an alliance caused by problems in the school-wide peer society, not merely a result of events in this class. But it did cease to function as an island of resistance in this particular class, and its defensiveness in the total school group may have been weakened a little as a result of the experience.

Teacher Z succeeded in getting the informal grouping of members of the class to promote the purposes of the formal structure. The closed-session conversation within the clique was probably most helpful for the clique members themselves, but no class problems were solved by this procedure because the clique's self-imposed isolation was perceived by both the class and the clique. The clique just wasn't a part of the class. The teacher did provide four important conditions for assimilation of the clique: He showed the clique how its conversation, expressing aggression against the class, could be made helpful to the class. He gave the class the same privileges of participation that the clique had seized for itself. He reduced the visibility of the clique as a hostile group, and thus rendered clique technique less effective as an instrument of aggression. He made it possible for the clique members to form interpersonal relationships that would satisfy more needs than the need for protection alone.

Acceptance of people means acceptance of their associations which make possible different sorts of self-expression and contribution. Mutual-interest groups or artificial, short-term cliques are particularly useful when the class is emotionally confused and when creativity is required to solve a group-accepted problem.

The required methodology to take account of the above-mentioned interrelationships would appear to be some sort of integration of social psychology with educational psychology. We must find a methodology which will somehow reconcile concepts of student goals (e.g., chap. vi) with problem-solving methodology (chap. viii); and this must be done in such a way as to capitalize on the sources of motivation (e.g., chap. ii) within a broad framework of learning principles (chap. i).

In general terms, the methodology of group instruction can be characterized by these phases: (*a*) assessment of the state of affairs and the diagnosis of the needs within the group; (*b*) planning activities to meet these needs; (*c*) carrying through the activities planned; (*d*) evaluating the success of the activities in terms of the purposes for which they were planned; (*e*) reassessment and diagnosis; (*f*) replanning, and so on, as continuing cycles (**15**). Each of these phases is carried out so as to solve simultaneously the group-process problems and the school-achievement problems. Generally speaking, the group-process problems take such form as why we are all bored, how to organize our efforts, what means are to be employed; while school-achievement problems are concerned with what changes of behavior are desired and to what extent they occur—in effect, problems of ends. These means and ends considerations come together at two points. First, the appropriate specific means and ends during a given activity emerge from the psychological needs and conditions of the group itself as a particular set of people with a particular teacher studying particular content in a particular situation. Second, these two aspects emerge deductively from analysis of the requirements of activities which will satisfy the major educational objective (**25**).

The phases listed above constitute the formal structure of the methodology. To carry out these phases requires considerable sensitivity so as to achieve effective continuity of experience for all the students and for the group as a whole. In the remainder of this section the methodology will be illustrated by showing how these considerations enter into (*a*) the identification of the problems to be solved, (*b*) the selection of goals, and (*c*) the solving of problems. Throughout this discussion two closely allied principles will be emphasized continually. First, that the group must learn to substitute the authority of its own tested experience for the authority of any individual or institution; and second, the climate or atmosphere of the group must be neither teacher-centered, content-centered, nor learner-centered, but rather "reality-centered" and objective.

Identification of Problem and Involvement of Problem

The effective procedure is to identify problems and deal with them during the identification process in such a way that, by the time a decision for action is made, every member of the group feels a strong commitment and readiness for action. It is a matter less of trying to secure involvement of students in proposed problems than of identifying the problems the students are already involved in and then modifying or guiding the problem-solving effort to achieve school objectives during the solution of the problems. The students may be expected to accept the teacher's proposals for content and for educational objectives but they cannot be expected to learn this material until they see its relationship to the problem they are involved in within the group.

Rather than asking the question, "What are you interested in?" or "What do you think you would like to do?" to identify the problems students are involved in, the teacher should ask the question: "What are you now doing, why do you need to do it, and how can we do it better?" The most appropriate problem focus for the group is that problem about which everybody in the group has feelings or about which a good deal of feeling centers. The feelings may be very different from student to student but all are aroused. This is another way of saying that all are close to action. Such problems arise because the students perceive the objective reality in fundamentally different ways, and this results in conflict in behavior (**13**). Since involvement of the group requires meaningfulness and since meaningfulness is related to visualizing possible actions, the problems the group is most involved in are the problems of facilitating and controlling their own group processes.

The development of group standards and of group procedures must be contributed to by every member in one way or another. And this can be an active process of self-realization for individuals if the group makes intelligent use of its own innergroup resources. The most appropriate resources of the group for setting its standards are the attitudes, knowledge, and skills of the members. Under conditions of complete permissiveness within defined boundaries, individual freedom to contribute is greatest, and there is maximum group utilization of contributions under these conditions. There is a high degree of individual self-direction disciplined (in the best sense of the word) to the demands of the group tasks (**25**). In short, there is sufficient constructive psychological interdependence that the individual can be free (**3, 22**).

The range of inhibiting fears in a group may be large. In one graduate seminar, the students interviewed one another on the question: What factors tend to make it harder for you to participate?

The answers included: fear of lack of acceptance (e.g., fear of loss of status); fear that his contribution will be seen as inadequate or irrelevant; feeling of lack of orientation to the group; distaste for groups in general; fear of lack of background; fear of giving offense (in situations where group values are not clear); fear of failure in the role expected by the group; fear of being perceived as striving for power; difficulty of showing felt aggression; fear that the method of teaching will be unproductive. In this particular class the inhibiting effects of many of those fears were spontaneously reduced by "getting them out into the open" and realizing that other people felt the same way.

Selection of Goals

In classroom-learning many kinds of goals may be considered: long-range goals or short-range ones; goals that are means to other ends, or goals that are ends in themselves; those that are inferred from the needs of society or those that are inferred from the psychological characteristic of the learner; and so on. However, from the standpoint of group process, the consideration of most importance is whether the goal is merely *desired* or whether it is actually *anticipated*. On the whole, the group is usually concerned, even though it may not make this concern very explicit, with the degree of accord between its activities and its stated purposes. A group likes to have its anticipations come true, and, when something else (perhaps later on seen to be more desirable) happens, the group tends to be disturbed. If its goals are merely desires based on long-range ideals or conventional stereotypes, they are likely to be unrealistic and not in accord with the activities the group is in a position to undertake. While these goals serve a useful psychological purpose (5), if they are the only goals, they lead to disturbance and disappointment rather than serving to guide student experimentation.

If the group goals can be real anticipations of the result of its activities, they must be operationally defined. Then they yield the criteria for judging the success of the attack made on the achievement problem. They connote not only a direction or kind of growth but also an amount; they include aspirations. To get an operational definition requires that in a particular situation the long-range goals must be reflected upon and their implications for action in the situation be discerned. This is the deductive derivation of specific goals from long-range ones.

A distinction is often made between a learning group and an action group (**6**). The difference now can be stated in terms of the characteristics of the goals. The learning group can be thought of frequently as being guided by short-range anticipations and as having extremely flexible goals. The action group typically has long-range desires and fairly inflexible goals. The action group is usually committed to the solution of one particular type or family of problems. The learning group is committed to no one type of problem but has scope for considering any question which represents conflict in need of resolution. The point usually overlooked, however, is that the learning group must still proceed by the method of problem-solving, and the action group must give due regard to its own group-process problems. It is when either of these requirements is violated that each group wishes that it were the other kind. The need for action (e.g., the psychological feelings of release which are associated with action and problem-solving) in the learning group is fairly easy to diagnose and is probably a basic factor in determining rhythm and pace.

The psychological importance of group goals must be recognized. The goals selected largely set the limits of content and procedure for the group. They determine the quality of achievement expected. They help to guide and clarify the particular actions required. They enable the individual to identify himself with a group ideal. They provide the unique criteria for success and failure in each situation. They give a long-range perspective for insuring continuity and getting the group over the chaotic periods between defined problems. They provide the focus which makes possible conscious problem-solving techniques. Because of their importance, their selection so as to promote effective group processes and to result in the solution of school-achievement problems is a matter for continuing attention by the teacher.

Group Problem-solving

There should be the possibility in the group process of modifying the goals, particularly immediate goals, as a result of the group assessment of satisfaction, progress, and appropriateness of behavior and learning. One can anticipate in any group considerable flexibility in skipping from problem to problem. When a group leaves a problem for "incubation"[16] while another is undertaken, or when it returns to dig deeper into a problem already supposedly "solved" at a superficial level, the procedure may often be an indication of effectiveness rather than a sign of regression.

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[16] See chap. viii.

The average classroom group has been so conditioned by previous experience that it accepts without examination many folkways and limits that do not actually need to exist. At the present time many groups unquestioningly adhere to all sorts of rituals, such as looking everything up in a textbook or writing a paper or asking the teacher (**8**). There is a lack of freedom to engage in the necessary experimentation for solving problems realistically, and there are taboos against examining group process. The teacher should not allow the group to take over any single model for problem-solving. Analogies, in particular, are to be avoided or at least accepted only after serious probing. Techniques of problem-solving useful in the past are likely to be overworked, particularly if they have been frequently practiced in the past by members of the group, but, at best, they are formulas whose appropriateness must be tested before use in each situation.[17]

The setting up of a hypothesis invokes primarily the prediction of consequences of carrying out the projected action. If-then thinking is possible in areas in which principles are well developed (such as in physical science), but it is likely to be difficult in areas of social relationship. In this case the testing of the hypothesis in anticipation of action might well amount to a prerehearsal of action, and this can be done in several ways: (*a*) application of principles verbally — primarily a deductive matter, (*b*) in the social area, acting out the proposed course of action through spontaneous drama to see if people will react the way they are expected to react in a carefully set up test situation (**11**), (*c*) making use of consultants, such as authorities from outside the classroom, who are able to ask intelligent questions, (*d*) consulting one's own subjective feelings and intuitions, followed by an effort to understand and rationalize why one feels the way he does about it. As we observe student discussions we often see nearly all of these methods of prerehearsal in use. They should be made explicit, sharpened up, and carried through as far as possible. The actual results may later be compared with the predictions obtained from these various kinds of prerehearsal, and the appropriateness of each kind of prerehearsal may then be better judged.

During the suggesting and testing of hypotheses and the planning for action, remarks made by each student and the way in which they are made can be interpreted to indicate what sort of involvement and what level of participation makes sense for him. Any special assignments should be made on the basis of such appraisals.

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[17] Cf., chap. viii.

Planning may be assumed to be complete when each student feels satisfied with his answer to the following list of questions:

1. What are the immediate purposes of this activity?
2. What, if any, special service role do I have in the group for this activity: resource person, organizer, summarizer, leader, observer, secretary, etc.
3. How do my efforts tie in with the efforts of others during the activity? How will our efforts be co-ordinated? What is expected of me?
4. What are the consequences and products expected from this immediate activity? What further activities may result? What report is to be made? What tests are to be taken?
5. How can I tell whether I am being successful at all points? What subgoals do I have, and by what means may I probe the probabilities of success?
6. What recourse do I have at all times during the activity for help, not only in working with the group but also in carrying out any job I may have apart from the group?
7. What are all the ways in which the activity is to be evaluated, and what are the rewards attached to success?

A student must, of course, have answers to these questions, whether the activity in question be that of carrying out a homework assignment, participating in committee or subgroup work, or simply joining the class in a discussion, field trip, or experiment.

THE ROLE OF THE TEACHER IN THE METHODOLOGY OF CLASSROOM EXPERIMENTATION

The methodology of group instruction is primarily a highly developed experimental approach to the creation of the sequence of learning experiences. It is a method which offers promise for utilizing rather than being blocked by individual differences. Through recognition of the group-process problem it attempts to make effective use of usually disregarded but powerful motivational forces; it attempts to give guidance to the processes of learning from moment to moment rather than from examination to examination. And it is based on the philosophical assumption that the most precious asset of a democracy is a self-directed citizenry whose bases of authority are tested experience, whose goals are realistic, and whose methods of working are appropriate to the goals (7).

It may be helpful at this point to anticipate some possible misunderstandings which might arise from some of the preceding statements:

1. The major purpose of this methodology of group instruction is to develop individuals whose goals are socially desirable and who are consciously guided by objective assessment of their own needs in a situation. The methodology sets up no ideal of conformity at the level of particular patterns of thinking or specific conduct; there is, however, an ideal of an educated man who can utilize his own talents for the maximum good of himself and others.

2. The methodology does not assume that all learning, or even the most significant learning, goes on within the classroom group. It does, however, assume that all learning, whether in the group or not, is influenced by the image of the group and the group standards that the student carries in his own mind. There are times when it is to the best advantage of the class for each individual to work by himself. The organization of ideas, for example, is very difficult for a group to carry through. Moreover, the group generally presents a continuous battery of stimulation which makes difficult the sort of reflective fantasy which produces truly creative and original ideas. The assumption we wish to emphasize is that whatever the individual does will be done better and to greater benefit to society if the individual can visualize a group which will give him approval and further his realization of basic needs. In other words, the method is concerned with the factor of social reinforcement of individual effort, but it also recognizes that social reinforcement is a condition which is built up through the process of individuals becoming a group.

3. The methodology of experimentation probably will result in greater fluctuations of confusion and doubt on the one hand and experience of success on the other. The only way to prevent confusion at all times is to have available an authority who will tell us at every moment what is right and that we are performing satisfactorily. Any methodology which holds that this kind of dependence relationship is bad is sure to be characterized by more confusion and frustration from time to time. The teacher's responsibility is to keep this frustration within tolerable limits and to guide the group in examining its causes and the methods for getting out of it through productive effort.

4. The methodology of experimentation is neither "soft" nor "laissez faire." It requires from the students self-directed efforts, ob-

jectivity, and problem-solving. It emphasizes the importance of problem-solving based upon diagnosed need rather than upon expressed collective interest. It insists upon the examination of its own group procedures, diagnosis of strong and weak points, and decision about how they can be dealt with for greater production. It recognizes, however, that without individual involvement there can be no learning, and it strives for a type of involvement which releases and utilizes basic drives rather than depending only upon motivation developed by the learning situation (**10**).

In considering what sort of skills and attitudes are required to utilize this methodology, we may identify six roles which the teacher will play in one way or another and, to some extent, simultaneously while he employs the method:

1. He is a representative of a particular subculture of society in which he has become habituated. His perception of social customs, his political biases, his philosophical leanings, his cultural goals, all represent a particular way of life. His responsibilities as a member of the group require that he feel free to express opinions, that he share in the group feeling, and that he contribute his own personal resources.

2. As a teacher, however, he must also be a social analyst, capable of looking at himself and his own subculture objectively against the background of a broad social context. He must be able to deal with his own customs and biases with as much objectivity as he can deal with those of the students, and he has a particular responsibility for interpreting the representativeness of his own views and behaviors to the group.

3. He is a subject-matter expert, educator, and institutional authority. He must be able to adjust to the perception of the students that he has higher status in these areas. At the same time he must know the limits of his own competence and not be seduced into playing the expert in areas where he is not competent. In short, he must know what his skills and knowledge are and the extent of his power.

4. As an experimentally minded methodologist, he must be able to use himself as an expert judiciously. He must be sensitive to the group problems and must be ingenious in helping the class test the validity of its "hunches" through its own experience and through the wise use of records of the experience of others. Primarily, he must have the objective attitude of the scientist and must be able to keep the problems of the group and the problem of achievement,

rather than himself and his needs, as the central challenge to the group.

5. To some extent, he must have some of the insights and skills of the personal counselor. He must know how to handle anxiety and tension in individuals and the group in such a way that it remains within boundaries of tolerance but is sufficiently high that there is a real drive for problem-solving. In particular, he must be able to tolerate periods of silence or suspense and, at times, even the hostility of the group, particularly when it is working through its relationships with him.

6. The teacher must realize that he will be seen differently by different students. He is a representative of adult society, and the attitudes of the students toward the adults in their lives may be projected or directed against him. Young children may attempt to establish a child-father relationship with the teacher and, in this relationship, wish to work out some of the problems they have with their own fathers. Older children may regard the teacher as a representative of the opposite sex whose responses to their tentative experimentation may have a great deal to do with the adjustment of the student in this area. The teacher may simply symbolize authority in general rather than any one particular personal authority. He may receive all of the resentment that students, who feel too cramped in an adult world, cannot safely express elsewhere. Primarily, the requirements in this sort of situation are objectivity in seeing what the students' real need and purpose in establishing the relationship is and an ability to accept without feeling of guilt, punishment, or anxiety the legitimacy and importance of such problems of the student.

In coming to know himself better and in developing sufficient security for the necessary undertakings of his job, he must feel aware of the sources of his satisfaction as a classroom teacher. He needs to have goals to which he is sincerely committed, not only those that serve as long-range goals of education but also goals for the school and the particular goals of his classes. He must come to terms with the different problems of classroom autonomy versus possible submergence in the faculty and be able to slip flexibly from "leader" to "follower" roles in various groups. He must be able to evaluate his own role in all of the overlapping groups in which he is a member. Besides the classes, there are the parents, administrators, colleagues, community, and other groups. In particular, he must not carry over into one group the frustrations arising from another. He should be able to perceive the way in which other people perceive him so that he can more adequately assess and develop his own membership roles.

APPLICATION OF THE METHODOLOGY

The formal statement of the methodology of instruction describes the functions involved in planning, in experiencing the selected activities, and in interpreting those experiences. In short, it is necessary (*a*) to assess the state of affairs and diagnose the needs within the group, (*b*) to plan activities to meet these needs, (*c*) to carry through the activities planned, (*d*) to evaluate the success of the activities, (*e*) to reassess, (*f*) to replan, and so on.

Some such formulation of this cycle is familiar in our thinking about unit plans, contract plans, and the like. But the same sort of cycle also operates within an hour, and even from minute to minute; and the cycle needs to be applied not only to curricular achievement problem-solving but also to group-process problem-solving.

The illustrations given earlier may be usefully examined from the standpoint of these functions.

In example 1, we note that Miss G. made an incorrect assessment of the state of affairs in the group. Her own fear that the students could not safely work with chlorine biased her judgment and led her to abandon her usual democratic and effective planning procedures. Mr. K.'s diagnosis of the group's maturity was accurate and planning was effective.

In example 2, Mr. F.'s conception of "democracy" (which he confused with laissez-faire operation) blinded him to the psychological needs of the students in the areas of dependency and self-direction. He also had unexpressed reservations about what content was appropriate, and his failure to make them known to the students put them in the position of having to guess what was in his mind. The discussion with the alderman, in which Mr. F. played the role of observer, gave him a chance to evaluate the defects in the planning and action up to that time. He had here the material for a more accurate rediagnosis, and his further planning could be more realistic.

In example 3, we see the cycle in operation over a long period of time. The teacher correctly diagnosed the students' feelings about his authority, enabled the group to evaluate the problem itself and to plan for the steering committee. After a period of time, the steering committee, set up experimentally, was evaluated and dispensed with because it was no lônger needed. This example shows accurate diagnosis of problems when they occur, followed by intelligent planning, action, and evaluation as the situation changes.

The homeroom class, example 4, shows accurate diagnosis of need, planning, and execution of the first sociodrama. We then find that rediagnosis and further planning becomes unsuccessful due to the teacher's loss of objectivity as a result of her own self-concern. Her own need to avoid failure at all costs makes it difficult for her to make correct diagnosis and to share planning with the group.

In example 5, the vocational guidance class operates effectively in diagnosing vocational needs and in planning the interview activity. It falls down badly in not being equally sensitive to its group-process needs, and only becomes aware of its faulty diagnosis when it is confronted with the need for action. At this point the teacher becomes aware of his false assumption that surface behaviors reflect the real motivational situation in the group, and he gets the group to share in the evaluation of its own operation so that further planning will result in effective action.

In example 6, we see three teachers dealing with the clique. All three diagnose the clique as, to some extent, blocking progress in both achievement and process problem-solving. Beginning with this common diagnosis, the three teachers plan and carry out action. The first two teachers aggravate the situation through lack of adequate understanding of the psychological principles involved; the third is successful because he understands and can apply the principles.

The functional cycle is seen to operate over different periods of time. It is carried out subconsciously from remark to remark; every statement implies both an evaluation of the activity as well as an implication for further action. The cycle is carried out grossly in the progress through a unit of a year's work. Each specific decision made involves this cycle.

The cycle is seen to operate at different levels of awareness. Ideally, the more aware one is of its operation the more effectively intelligent thinking can facilitate decision-making. Closely related to the level of awareness, however, is the problem of anxiety and security. Awareness of problems beyond one's ability to cope with them may lead to anxieties which block objectivity and achievement. The safest rule is to give the class opportunity to evaluate its own difficulties and skilfully to follow its lead in formulating the problems.

The cycle is seen to operate in different people and with different amounts of sharing. The teacher's responsibility for the functions encompassed in the cycle is clear. It does not follow that either the teacher or the class should do all the diagnosing and planning. Class diagnosis and planning is clearly essential when obstacles to progress are felt. The evaluation needs to be carried out by the group when each person's perceptions are needed as evidence. As the method is used and the class grows as a group, the cycle is carried out with greater awareness and efficiency and with respect to more and more of its "real" problems.

In general, the topic of the unit indicates the general area of the school-achievement problems. Earlier chapters of the yearbook imply that the task, from the point of view of the school-achievement problem, is to get pupils involved in activities which require them to analyze and solve problems relating to this area, and which give them clearer perceptions of the effects upon themselves and their fellows of various common social attitudes and skills related to these problems. The task, from the point of view of group process, is to involve the group in formulating, attacking, and achieving effective learning through activities focussed on the achievement problem.

In referring to school-achievement problems which pupils are to become involved in, to analyze, and to solve, there is no intention of limiting in any way the content or objectives of high-school instruction. The problem may be of any type, such as developing understanding of something, acquiring a certain skill, finding out how to get satisfaction from some aesthetic experience, developing a different attitude toward something, and so on.

The class group provides not only the setting for learning activities but also the possibility of deeper motivation and more extended meaning. Effective high-school instruction requires the use simultaneously of principles of individual learning with those of social psychology (**20**). By dealing both with school-achievement problems and group-process problems, efficient guidance of learning is possible.

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SECTION IV

THE PSYCHOLOGY OF LEARNING AND TEACHING PROCEDURES

CHAPTER XIII

THE SCHOOL AS A LEARNING LABORATORY

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INTRODUCTION

In his autobiography, *The Other Side of Main Street*, Henry Johnson[1] tells an interesting anecdote concerning the field of method. On one occasion when Johnson had reviewed for a class the various "methods" that followed each other at frequent intervals during the first part of this century, a student, at the conclusion of the review, asked: "What will be the next method, Dr. Johnson?" Johnson thereupon "invented," for the immediate purpose, the "radiation method" and elaborated the concept at some length. Amused at his invention, he asked his colleagues at lunch what they thought of the "radiation" method. One piously proclaimed that it was the coming method, full of promise. A wiser colleague had "never heard of it." A third remarked, "Johnson, why don't you call it by its right name, the *hot air method!*"

This anecdote serves to indicate a mental set concerning instruction which has too long persisted in the schools. Method has focused on the procedure of the teacher. While activities for students have been sensed as being important, the teacher "ran the show," so to speak. This yearbook focuses attention upon the learner and makes his activity (implicit as well as overt) the central problem of instruction.

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[1] Henry Johnson. *The Other Side of Main Street.* New York: Columbia University Press, 1943.

Instruction is defined today as the process of guiding and directing the experiences of children to the end that they *learn*. Much of the specific instruction which children receive takes place in schools and, within the schools, in classrooms. Instruction in the school should consist of the guidance and direction of the experiences which children have there so that behavior patterns in harmony with the objectives of education will emerge.

Schools should be learning laboratories. This would seem to be the central generalization to be derived from the earlier chapters of this yearbook. Classrooms, which have been the chief centers of instruction, should cease to be lesson-hearing rooms. Rather, they should be centers where children engage in the activities that will lead to the learning which is socially desirable.

Principles Which Should Guide Instructional Processes

A number of principles concerning learning and how it should be directed have emerged from the previous chapters. These may be listed as follows to serve as a guide to teachers and others concerned with instruction.

1. Teachers should, as a first step in instruction, have clearly formulated in their minds the educational objectives they are to attain through the instructional process. This means that if a teacher undertakes to develop a unit of study on the Soviet Union, for example, he should know what the children ought to derive from the experience.
2. Educational objectives should be translated into behavior patterns—patterns of knowing, understanding, appreciating, desiring, adjusting, doing, and thinking that become functional aspects of the child's daily living.
3. Educational objectives become patterns of response of the type just enumerated as children have the guided experiences designed to achieve these objectives.
4. The primary task of the teacher is to manipulate the classroom environment so that children will have educative experiences. This manipulation takes the form of selecting and organizing experiences which are educative and of guiding and directing children in these experiences.
5. New behavior patterns, both desirable and undesirable, are established in terms of the goals which children themselves attempt to reach through their activity.

6. Goals for learning activity are established in terms of children's motives—their wants, needs, interests, or drives.
7. A first step in the actual instructional process is to formulate, with the children as participants, the goals to be attained as they work and learn.
8. Content and activity are means to ends, these ends being new behavior patterns. Content and activity are not ends in themselves.
9. Learning takes place or fails to take place in terms of the individual child. While instruction is usually a group procedure, learning is always an individual process.
10. The teacher as an individual personality is an important element in the learning environment. The way in which his personality interacts with the personalities of the children being taught helps to determine the kind of behavior which emerges from the learning situation.
11. Interpersonal interactions among pupils are important elements in the learning environment. These personal interactions are in part responsible for the kinds of social, emotional, and intellectual behavior which emerge in the learning situation.
12. Evaluation is an integral part of the instructional process. Teachers and pupils should be continuously considering together the contribution of different experiences to goals sought. The on-going experiences should be restructured in light of the evaluations being made.

The foregoing principles have equal validity for elementary and secondary schools. They are equally applicable for guiding learning both in so-called academic or subject-matter areas and in the activity areas such as music and art, physical education, health education, or vocational subjects. Entire programs in some schools and instruction in several curriculum areas in other schools reveal that these principles are followed at the present time. As students carry out purposeful work in the shop or school garden, produce a creditable school paper, or have valuable camping experiences, they are being guided in learning experiences in accord with the principles enumerated. Likewise, as students plan and carry out illuminating experiments in science classes, collect material for and conduct panel discussions on current social issues, set up a budget for a small family as a social-studies project, or select current fiction titles for library acquisitions as an English assignment, they are experiencing instruction in harmony with principles which make the school a learning laboratory.

Practical Issues Which Emerge

The instructional procedures which are proposed herein involve a number of issues that need to be discussed. Some of these are pseudo issues, arising out of misconceptions, prejudgments, and misinterpretations of what has been written in this yearbook. Others are real issues. Three will be treated.

A first issue, and a basic one, may be stated in this manner: Is it necessary for the teacher to be more than a genuine scholar in the area in which he teaches? Must he also be a student of educational principles and processes including the psychology of learning? The majority of those in the educational world have given their answer as only a slightly equivocal "Yes." The justly famed Harvard Report[2] seemed to disparage the contribution of educationists but did acknowledge the validity of at least a minimal training in educational psychology and in practice teaching. Teachers at the college level probably have been the last to see the need for training in the ways of teaching. Their position has, however, recently been challenged on a variety of fronts. One of the most forthright challenges has been offered by Tead in his volume, *College Teaching and College Learning*.[3] This statement is particularly important for the direct attention it pays to the psychology of learning as applied to college teaching. Those who would take a negative position on the issue of a teacher needing to be more than a master of teaching content are assuming an untenable position in the light of empirical judgment and educational research, as these are reflected in the earlier chapters of this yearbook.

A second issue, of long historical note, is this: Shall knowledge be a primary end of education or is it but a means to other educational ends? The position taken in this yearbook is that knowledge (and in broader connotations, activity as well) is a means to an end, that it is important as it contributes to desirable behavior patterns in the lives of children.

Whitehead once wrote: "Education is the acquisition of the art of the utilization of knowledge."[4] The emphasis in this sentence can well be put on the phrase *the art of utilization* of knowledge. In a longer statement, Whitehead expanded his conception as follows:

> The solution which I am urging is to eradicate the fatal disconnection of subjects which kills the vitality of our modern curriculum. There is only one subject matter for education, and that is life in all its manifestations. Instead

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[2] *General Education in a Free Society*. Report of Harvard University's Committee on General Education. Cambridge: Harvard University Press, 1945.

[3] Ordway Tead, *College Teaching and College Learning*. New Haven, Connecticut: Yale University Press, 1949.

[4] Alfred North Whitehead, *The Aims of Education*. New York: Macmillan Co., 1929.

> of this single unity, we offer children algebra, from which nothing follows; geometry, from which nothing follows; science, from which nothing follows; history, from which nothing follows; a couple of languages, never mastered; and lastly, most dreary of all, literature, represented by plays of Shakespeare, with philological notes and short analyses of plot and character to be in substance committed to memory. Can such a list be said to represent life, as it is known in the midst of living it? The best that can be said of it is, that it is a rapid table of contents which a deity might run over in his mind while he was thinking of creating a world and had not yet determined how to put it together.[5]

While Whitehead's remarks are directly relevant for the curriculum of the school, their relevancy for instruction is clear. Teachers must guide the experience of children along lines that have pertinence to their lives and to the society of which they are members. Instruction which merely imparts information which becomes knowledge is not enough.

There has been one current and most curious misinterpretation of the proposition that knowledge is not enough. Some persons seem to say knowledge is not important. They seem to deny the validity of knowledge as a product of instruction. This yearbook has not made this error. In the important and detailed chapter by Brownell and Hendrickson, the significance of knowledge, of the understanding of concepts, principles, and generalizations is surely established. We mention again the thesis of Whitehead that the problem of education is the *utilization of knowledge*. This point of view certainly does not deny the need of knowledge. We may also cite the argument of Thorndike's chapter on problem-solving which establishes the role which information plays in this area.

Education in these days has sometimes been accused of being anti-intellectual. This accusation cannot be supported by reference to the points of view expressed in this yearbook. To assert that knowledge alone is sterile is not to deny the significance of knowledge when it is accompanied by insight. This yearbook gives abundant attention to learning which is intellectual in character.

A third issue involved in planning and directing instruction centers on the place of interests and other motives to learning. The question here is about as follows: Shall teachers, as they instruct, be guided by the interests of children, the development of which is *not* a basic instructional problem, or shall teachers assume responsibility through instruction for developing interests and other motives? One chapter has been devoted to the problem of motives; a second has treated

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[5] *Ibid.*

interests and other motives as products of learning. Evidence is presented that interests and attitudes, operating as motives, are a product of the experiences which children have. In other words, instruction should develop interests and other motives, not merely utilize those which the student already has. This point of view, if accepted, should clarify certain confusions now found in educational practices. It is not enough for teachers and curriculum-makers to discover the interests of students and arrange an educational program accordingly. Rather, through curriculum provisions and wise instruction, interests may be learned. These learned interests, planned for, become the bases for expanded educational activities. Instruction need not be passive about the motives of children. It can and should develop motives.

SIGNIFICANCE OF THE GUIDING PRINCIPLES

Let us now return to the set of basic principles which were derived from the earlier chapters of this yearbook and see what they mean for various features of the school—its organization and administration, its curriculum, its student personnel services—and for teacher-education institutions. All of these have important interactions with instruction and definitely affect its quality.

Organization and Administration. The school should be so organized and administered that all who have a role to serve in carrying out policies are given opportunities to participate in policy-making. Adult relationships must exemplify the kind of human relationships which the staff wishes students to develop. The relationships of the superintendent and principal, those of principal, supervisors, and teachers, and those of staff and parents, all influence students' learning. Unless the program of the school is organized in terms of purposes which the entire group has thought through, and unless the program is then evaluated in terms of these purposes, the teachers will not be in a good position to carry out an effective program.

This program should be carefully co-ordinated from grade to grade and from one classroom to another. A continuous program is dependent upon joint efforts. Those in the higher educational echelons must explicitly recognize and continuously act on the principle that all services and activities of the school ultimately have meaning to the extent that they enable pupils to learn behavior which society deems desirable. This is the basic criterion against which all organizational and administrative procedures must be evaluated.

Organization of the school day, particularly in junior and senior high schools, is a problem that, while secondary in importance, merits more attention than it has recently received. Present schedules of fifty-minute blocks, even when supplemented by additional time for laboratory work and such, is too rigid an organization to permit a school staff to develop learning laboratories. Core curriculums or common learning programs in which students and teacher may work as long as half a day together are much more appropriate. Integrated learning experiences may make unnecessary the daily meetings of classes for such limited periods of time as one hour. Work and study periods may be provided on other than a daily basis. There is great need for experimentation which will help determine the kinds of daily schedules that best promote learning. The high school probably can profit in this area from the experiences of the elementary-school personnel.

Curriculum. The curriculum is defined as experience; and it is in terms of experience that pupils learn. Curriculum and instruction are generally understood to be the obverse and reverse of a single educational coin—the means by which learning of pupils is brought about. It is doubtful that the two can ever be separated in function. However, there seem to have been tendencies in these last years to neglect the interactions of curriculum and instruction. But principles for the curriculum are now emerging which are basically the same as those for improved instruction.

The bases for deciding on the pupil experiences to be provided in the curriculum must include: (*a*) student purposes, interests, needs, and degree of maturity; (*b*) problems of the present environment of the boys and girls; and (*c*) the purposes the staff recognizes as values in our society. These must be used by the staff to give direction to the program. In other words, the objectives of life itself must determine the objectives of the school. Students must be given an opportunity to participate in the total learning situation. They must help decide the goals or the purposes of a given activity, and what experiences or what activities seem to give promise in reaching these goals. They must share in evaluating, as they go along and at the end of the unit, to see if their purposes have been accomplished. As pupils and teachers work together in thus formulating the dynamic, on-going curriculum, they are actually conducting and experiencing instruction of the highest type.[6]

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[6] The authors of this chapter wish it understood that it would be a misinterpretation of this paragraph to infer that the teacher does not have a highly responsible role to play in developing the dynamic curriculum. More, rather than less, preparation on the teacher's part is necessary because, as pupils participate, both curriculum and instruction are dynamic rather than static.

The very nature of experiences in the school must be radically changed both in terms of curriculum and instruction. In no sense should intellectual problems be minimized. Pupils must continue to have experiences which bring understanding of the humanities and sciences—the intellectual achievements of man which make our culture. But problems of living in the home, in the community, and at school must be included in the curriculum. A party, a week-end camping trip, driving a car, learning to swim—these are illustrative of the kind of experiences which will be recognized as important for incorporation into the school curriculum. The experiences mentioned above are problem-centered. In addition, the school curriculum must include creative experiences and opportunities for physical activity.

Every part of the school environment should be conducive to the best all-around development of students. In other words, every teacher has to recognize that in addition to giving guidance to the particular unit of work which is in process in his room, he is also responsible for seeing that effective communication skills are being developed, that the health of the pupil is maintained and improved, that desirable human relations are developed, that esthetic values are established, that new interests are created, and that pupils learn the processes of problem-solving and thinking. The faculty must decide upon the all-school outcomes in which it is interested, and then *every teacher has a responsibility to see that the environment under his jurisdiction fosters optimum development* with respect to each one of these outcomes.

Instructional Materials. All media of learning must be utilized to a much greater degree than in the past. This statement suggests that we must use to a much greater degree than in the past field trips, the radio and motion pictures, and various media of an art nature. Chapter ix of this yearbook provides an explicit statement of the role which instructional materials play in an improved instructional program.

Evaluating, Marking, and Reporting. The appraisal of learning has not been dealt with in detail in this yearbook. The authors of each of the chapters in Section III did, however, include a section on this important problem. The basic principles of evaluation are becoming well known. They are relevant to the improvement of instruction. We must evaluate the learning of children in terms of their behavioral changes toward accepted objectives. This evaluation must not be restricted to those changes which imply acquisition of information only. Changes which represent increased effectiveness in personal and social adjustment, acquisition of new interests and other motives, deepened feelings for human values, richer responsiveness in the area of the arts, and improved skill in solving problems of all types should be assayed. Techniques for evaluation have been the subject of other yearbooks of this society and merit still further attention.

A further important point, supplementing the principle that evaluation must be made in terms of valid instructional objectives, is that the evaluations should be used as guides to further instructional improvements. Evaluation is not the last step in the instructional process. Continuous improvement in instruction in the light of its evaluation is a part of the dynamics of the instructional program.

Marking and reporting practices need to catch up with the recognized principles of evaluation. Pupils, their parents, and others (e.g., employers and college officials) should expect and receive reports which give fair and accurate appraisals of the learning which has been achieved in the total school environment.

Student Personnel Programs. Student personnel programs should ultimately be evaluated as they contribute to the total effective learning of students. When the school is a learning laboratory, student personnel activities are a part of that laboratory. For example, students are learning as they receive guidance—as they are helped to make educational and vocational decisions or as they solve personal adjustment problems.

Student personnel services have, moreover, a special role in helping teachers know students in all aspects of their living so that all aspects of learning are provided for. These services should not exist apart from instruction but be intimately correlated with it. Teachers, counselors, and other specialized school personnel should work as a team whose ultimate goal is maximal growth and desirable social learning for each child.

Teacher Education. Obviously the best teacher-education program exemplifies the principles which are indicated in this yearbook on learning and instruction. Teacher-training institutions, while progressing, still have a long way to go. For example, the use of the lecture method as the main instruction process in teacher education is not the example to set before teachers in training who are to make learning laboratories of their schools.

The yearbook will very probably be widely used in classes in professional education programs. Be that as it may, it is more important that the principles expressed in this yearbook permeate the entire professional program. Students preparing to be teachers, as they observe, participate, and do practice-teaching, should see and conduct classes and total school programs which demonstrate the point of view that the school is a learning laboratory.

AN INTERMEDIATE-GRADE CLASSROOM ORGANIZED AS A LEARNING LABORATORY

While the total school should function in contributing to each student's learning, the bulk of the organized learning will continue for some years to be guided by teachers operating in classrooms. What would a classroom be like if it were directed according to the guiding principles set forth in this yearbook? To make the implications as concrete as possible, we have sketched a picture of an intermediate-grade classroom organized as a learning laboratory. But this picture, with few modifications, is accurate for classes at all instructional levels.[7]

The Classroom Is Attractive and Well Equipped for Learning. In a learning laboratory the environment arouses the child's curiosity and starts him on a search for new understanding. A bulletin board calls attention to items of interest. A supply of attractive pictures reflects the season or the units of study underway or suggests stimulating questions that lead to thoughtful work. The classroom contains a variety of attractive, illuminating reading materials chosen in the light of the goals to be achieved. Current magazines and pamphlets are available for finding answers to many questions as the children, singly or in groups, try to broaden their background on a topic. Photographs, slides, motion pictures, and the phonograph or radio are available in either the classroom or the school for the use of pupils as needed. Also, movable desks and worktables are arranged in a variety of ways according to the activities underway at the time.

In contrast to this type of room is the one in which few pictures and exhibits are displayed and these are mostly prepared by the teacher. Moreover, they are seldom changed during the term as learning activities change. If movable desks are provided, they are kept in straight rows.

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[7] Some may say that this picture which follows, indeed, this chapter and this yearbook, presents a pattern for teaching which is "ideal." It is probably true that few, if any, teachers can do all the things which might be inferred as "musts" as this yearbook is read. As the ideal is pictured, the practical teacher will tell himself that the ideal is an ultimate goal, not necessarily to be realized today or even tomorrow, but a high standard toward which to work and against which to evaluate present accomplishments.

The Pupils and the Teacher Are Friendly, Co-operative, and Sensitive to the Rights of Others. In a learning laboratory children learn to live with other people. There is a natural atmosphere and freedom of movement within the room. Honest differences of opinion are carefully adjusted through discussion. The teacher is sympathetic, understanding, and deeply interested in children. He frees the pupils from embarrassment and feelings of insecurity.

Quite different is the room in which the teacher directs the children to do as he says or in which the teacher himself seems tense and shows undue strain. The children do not welcome him as a member of any class group. Some pupils seem confused and frustrated because they cannot carry out the tasks assigned.

The Teacher Encourages the Pupils To Take the Initiative and Acts as a Guide to Their Thinking. The teacher encourages the pupils to define their problems, to set up worth-while purposes, and to try to attain these purposes. He stays in the background but is alert to the activities underway and does not allow the pupils to go off on a tangent. He provides help as the pupils encounter difficulties; and individual children or groups often seek his advice. As the work goes forward, the teacher discusses with the pupils the problem they have been attacking, the kinds of information needed, and the best ways of obtaining this information.

In a room that is not a real learning laboratory, however, the teacher makes routine assignments that lead the children to master subject matter and memorize facts. The pupils have no responsibility or opportunity for planning their own activities, and much time is frittered away in perfunctory activities.

The *Pupils Are Intent on Learning.* In order to insure learning, the teacher makes certain that the pupils understand the goals of their work and recognize the importance of what they are doing. The children show much interest in their activities, raise important questions, ask about things which they do not understand, and seek answers to their problems. They continue to put forth effort until they meet with success, and in later situations they understand how to apply the skills and abilities which they have acquired.

Under traditional instructional procedures, however, the pupils are not intent on learning, and many of them merely do enough to "get by." At best, they endeavor to satisfy the teacher or to achieve some reward such as a star or a satisfactory mark on their report cards.

There Is Individualization within the Class. Since in any classroom the pupils differ widely in their interests, abilities, and needs, in a learning laboratory pupils of different abilities engage in different activities and reach different goals. During work periods the teacher walks about the room and provides help according to individual needs. Individual contributions are encouraged within the larger problems being studied by the group. The teacher has individual conferences with the children; he provides special drill and help for the slow child, and sets tasks difficult enough to challenge the most advanced pupils. He keeps cumulative record cards, makes use of information gathered on home visits when there has been a need for such, and confers with parents about their childrens' development. By contrast, in a traditional classroom, all the pupils are expected to work on the same assignment. The problems chosen for study are often suited only to the bright pupils. As such, they are much too difficult and have little meaning for the rest of the class. The class works as a unit with few opportunities for group work, and special needs are neglected.

The Teacher and Pupils Make Use of the Larger Community. Laboratory learning is organized around centers of interest related to the child's experiences and his environment. Instead of dividing the class program into formal periods allowing so much time for reading, spelling, and so on, the program is integrated into large meaningful units. The pupils bring in illustrations of what they have noticed outside of school in relation to the unit; they tell of places they have visited and exchange personal experiences, greatly enriching their study. Comments of the children show that they see life applications of what they are learning. There is evidence of field trips and excursions. Community resources are reflected in the materials and displays in the room.

This is the opposite of a classroom in which life is separate from that of the community; in which the teacher and pupils bring in few outside materials and live in a world of books only.

The Child's Growth and Development Is Encouraged in Every Way. The teacher fosters critical thinking and purposeful use of time. To these ends he shows the pupils how to plan their work, introduces them carefully to new skills which they will need to use, shows them how to assemble materials bearing upon their problems, and illustrates efficient use of these materials. He encourages the pupils to make good use of available libraries. He gives them constructive suggestions as they work and leads them to develop good work habits and to evaluate their own work. In a word the teacher shows as much interest in the methods which the pupils use in carrying out their work as in the results they attain.

In the classroom which is not a learning laboratory, much time is wasted by the pupils, and poor work habits result. Emphasis is placed on studying lessons and reciting them. For example, when reports are to be prepared, pupils copy material verbatim out of their books; they page through a book rather than consult the index. Spelling errors are allowed to go uncorrected because it is not spelling time. Little attention is given to the use of good English. In such a room there may even be evidence that the pupils have not been taught to conserve school property.

Concluding Statement

In this yearbook there has been an attempt to present a revised statement of the meaning of instruction in the schools. The basic theme has been that instruction procedures must be rooted in an understanding of the ways in which children learn.

While the process of learning has a fundamental integrity which has been outlined in chapters i and ii, the process is more clearly understood and has fuller implications for instruction as its operation is made explicit in terms of various categories of behavior. In Section II of the yearbook it has been shown how children learn motor skills; knowledge and principles; attitudes, interests, and motives; emotional and social control, esthetic types of response; and the procedures of problem-solving. It is in terms such as these just enumerated that objectives for education which are operational in character will have to be set. Experiences for children in the schools will then be formulated in terms of these objectives and in harmony with the detail provided in the respective chapters. This is the essence of the instructional process.

Principles have been derived from the chapters of Section II, and their meaning for instructional organization and application at the various grade levels has been laid down in Section III. A reading of this section should show teachers at these levels how, in general terms, instruction in harmony with the facts of the psychology of learning can be carried on.

The conclusion has been drawn in this final chapter that schools should be learning laboratories. Classrooms, which have been and will continue to be the chief centers of instruction, should cease to be lesson-hearing rooms and become laboratories for learning.

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